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Research Master Human Movement Sciences
VU Amsterdam

Report of the limited programme assessment
January 22nd and 23rd 2019

Utrecht
April 2019
www.AeQui.nl
Assessment agency for higher education

Colophon

VU Amsterdam
De Boelelaan 1105
1081 HV Amsterdam

Programme:	Master Human Movement Sciences: Sport, Exercise and Health (research)
Location:	Amsterdam
Mode of study:	Full-time
Croho-registration:	60812

Assessment committee
Raoul van Aalst, chair
Nicole Wenderoth, domain expert
Gertjan Ettema, domain expert
Anton Wagenmakers, domain expert
Vera Broek, student member
Titia Buising, secretary
The committee was presented to the NVAO for approval.

The assessment was conducted under the responsibility of
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Content

Summary

On January 22nd and 23rd 2019 an AeQui committee performed an assessment of the research master programme in Human Movement Sciences of Vrije Universiteit Amsterdam (VU Amsterdam). The overall judgement of the committee is that the quality of the programme is **good**.

Intended learning outcomes
The committee assesses the intended learning outcomes as **satisfactory**. The committee concludes that the intended learning outcomes have been adequately concretised with regard to content, level and orientation and meet international requirements. The intended learning outcomes reflect the Dublin descriptors and tie in with the domain-specific framework of reference, drawn up by all the Dutch programmes in human movement sciences in the Netherlands. The programme has an explicit focus on fundamental research in human movement sciences. Students are prepared for a career in research in academia or in other research institutes. Within human movement sciences, the programme offers a broad and multidisciplinary perspective and opportunities for students to follow their own interest in sport science, health or fundamental aspects of human movement. The committee appreciates the role of the advisory board.

Teaching-learning environment
The assessment committee assesses the orientation of the programme as **good**. The committee concludes that the programme enables students to realise the intended learning outcomes. The programme's focus on fundamental research is reflected in the structure and content of the courses. The programme is very closely tied in with the research of the Amsterdam Movement Sciences research institute and the lecturers involved. This contributes to the strong academic focus and topicality of the courses. The programme offers students ample room for making their own choices within the field of human movement sciences. The committee appreciates the interactive and small-scale teaching methods used in the programme. This allows for in-depth discussions that meet the level and intensity of a research master programme. Staff is very competent, enthusiastic and involved. Lecturers are very active in research as well. The team of lectures meets on a regular basis to discuss the content of the programme / tracks. Lecturers have ample contacts in research, inside and outside academia, and make these available for their students. The committee notes that the programme applies the legal enrolment criteria.

Assessment
The assessment committee concludes that the programme has an adequate system of assessment in place, and assesses this standard as **good**. The committee concludes that the programme has an effective assessment system in place. The intended learning outcomes are at the basis of this system. Effective measures are taken to guarantee the validity, reliability and transparency of the assessments, by using an assessment programme, the four-eyes principle and random reviews of assessments and theses by the examinations board. The level of the different assessments studied by the committee during the site visit was high; in addition, the committee appreciates the variety in assessment methods used. The examinations board and its sub-committees are effectively organised and safeguard the quality of the assessments. The committee especially appreciates the varied ways in which the board checks the quality of assessments and theses.

Achieved learning outcomes
The committee assesses this standard as **good**. Based on the studied documents and the interviews, the committee concludes that graduates of the research master programme HMS exceed the required level and the intended learning outcomes. The fact that the majority of graduates acquire a PhD position within six months after graduating attests to this finding. In addition, it was confirmed in the meeting with students and alumni that they are very capable of creating their own career path as a PhD or researcher within human movement sciences. The committee concludes that the overall academic quality of the studied theses is very high and agreed with the grades given. The committee notes that the topics of the many projects were of high complexity, challenging the students to such extent that excellent students may surface and are stimulated.

Recommendations
The committee recommends facilitating meetings between first- and second-year students to share experience regarding the elective courses and to support first-year students in making their choices with regard to these electives.
Furthermore, since the background of international students can be quite diverse, the committee suggests examining ways to equal the background (and level) of students in specific subjects.

All standards of the NVAO assessment framework are positively assessed; hence the committee awards a positive recommendation for the accreditation of the research master programme in Human Movement Sciences of VU Amsterdam. The committee concludes that the overall assessment of the programme is **good**.

On behalf of the entire assessment committee,
Utrecht, April 2019

Raoul van Aalst
Chair

Titia Buising
Secretary

Introduction

The research master programme in Human Movement Sciences aims to integrate fundamental scientific research with relevant questions from clinical and sports practice. The programme is closely related to research conducted at the the research institute Amsterdam Movement Sciences. The programme includes sport, rehabilitation, and regenerative medicine, with course topics stretching from molecular biology and neuroscience to exercise immunology and motor control. Students are trained in state-of-the-art research methods and advanced statistics.

The institute

The research master programme in Human Movement Sciences is part of the Faculty of Behavioural and Movement Sciences of VU Amsterdam. The faculty is the result of a merger between the Faculty of Psychology & Educational and Family Studies and the Faculty of Human Movement Sciences in 2015. The faculty provides bachelor's and (research) master's programmes for approximately 3500 students.

Besides the research programme Human Movement Sciences, the cluster of Human Movement Sciences also offers the bachelor programme in Human Movement Sciences, the master programme in Human Movement Sciences and the master programme in Musculoskeletal Physiotherapy Sciences. The lecturers of the four programmes are appointed by the department of Human Movement Sciences.

Each programme offered has a programme director. The programme director is primarily responsible for the development of the mission and vision of the programme, their translation into the programme's content, and for guarding that the courses and their assessments contribute to the end qualifications. The programme director is in close contact with the appointed course coordinators and the programme committee.

The programme is closely tied in with the research conducted at the Amsterdam Movement Sciences research institute. This research institute is a collaboration between the Faculty of Behavioural and Movement Sciences at VU Amsterdam, VU University Medical Center and the Academic Medical Center. The research is focused on improving, preserving and restoring the human motor system to allow optimal physical performance in work, sports, ageing and disease, based on fundamental knowledge of underlying mechanisms and principles. The research within the institute is organized in three programmes: Sports and Work, Ageing and Morbidity, and Restoration and Development.

The programme

The English taught research master programme in Human Movement Sciences (HMS) comprises 120 EC. The programme aims at training for so-called translational research; research on the cutting edge of fundamental and clinical human movement sciences that tries to integrate fundamental knowledge and clinical questions. The programme prepares students for scientific careers in the academia (as a PhD-student or junior researcher) or in R&D departments in industry or other non-academic institutions.

The first year consists of a combination of mandatory and optional courses, that enable students to personalise their own programme. The elective courses cover a broad spectrum of topics in human movement sciences. The second year is dedicated to the master research project, where students independently conduct their research, usually within one of the research programmes of the Amsterdam Movement Sciences research institute. Students can also opt for a minor / major research project, consisting of two research projects (and preferably one at another research institute).

Cluster visitation

Since the committee visited all human movement sciences programmes, it was able to see similarities and differences between these programmes. All universities involved have their own specific focus. Learning at Maastricht University is characterized by the problem-based learning concept. Human Movement Sciences at Maastricht University is offered at masters level, with specialisations in Health & Rehabilitation, Sports & Nutrition and Physiotherapy. Particularly, the strong expertise in nutrition, exercise physiology and the Physiotherapy specialisation are quite unique.

At VU Amsterdam, human movement sciences is offered at bachelor's and master's level. There is a strong focus and staff expertise on biomechanics, modelling, movement analysis and sports. The university also offers the only research master in human movement sciences in the Netherlands.

University of Groningen also offers human movement sciences at bachelor and master level. The bachelor programme has a strong focus on neuroscience and statistics. The master's programme Human Movement Sciences is a two-year programme. The programmes have a close relation with the departments in rehabilitation and orthopaedics of UMCG.

Even though all three universities offer a programme or specialisation in sports, the focus is different. Maastricht University addresses sports and nutrition. The VU focuses on sport psychology, biophysics in sports and high-performance coaching. In relation to elite sport, the programme is connected to cyclic sports. The master's programme in Sport Sciences in Groningen has a broad focus within this specific field, ranging from sport and cognition in children to performance analysis and optimisation in sport. Within top sport, the programme is more connected to (Olympic) team sports.

In general, the committee recommends all programmes to stay in touch with new technologies and developments, such as big data, machine learning and cutting-edge molecular analyses of human blood and tissue samples.

The assessment

VU University assigned AeQui VBI to perform a quality assessment. In close co-operation with AeQui, and the other programmes part of this cluster, an independent and competent assessment committee was convened. A preparatory meeting with representatives from the programme has taken place.

The quality assessment involved all universities (except from Nijmegen) and programmes that are part of the Human Movement Sciences cluster in the Netherlands. The site visits were held between January 21st and 25th. The site visit at VU University took place at January 22nd and 23rd, in accordance with the programme in attachment 2. The committee explicitly oriented itself on the cluster of which the programmes are part. This took place during the preparatory meetings for each site visit and the last committee meeting in which the final assessment took place. For the assessment of the master's programme Human Movement Sciences of Maastricht University and more specific the Physiotherapy specialisation, Bart Staal was part of the committee. The other committee members participated in all assessments part of this cluster.

The committee assessed all programmes in an independent manner. At the conclusion of the assessment, the results were presented to representatives of the programme. The draft version of this report was sent to the programme representatives; their reactions have led to this final version of the report.

Initiated by the programme, a developmental meeting will take place in October 2019. The results of this meeting will not influence the assessment written down in this report.

1. Intended learning outcomes

The committee concludes that the intended learning outcomes have been adequately concretised with regard to content, level and orientation and meet international requirements. The intended learning outcomes reflect the Dublin descriptors and tie in with the domain-specific framework of reference, drawn up by all Dutch programmes in human movement sciences. The programme has an explicit focus on fundamental research in human movement sciences. Students are prepared for a career in research in academia or in other research institutes. Within human movement sciences, the programme offers a broad and multidisciplinary perspective and opportunities for students to follow their own interest in sport science, health or fundamental aspects of human movement. The committee appreciates the role of the advisory board.

Findings

The programme aims at integrating fundamental scientific research with relevant questions from clinical and sports practice. Within the programme students can focus on sport, health, or more fundamental aspects of human movement. Students are educated at an academic level including theory and research methodology.

Focusing on sport science includes training in modelling human endurance performance and in biomechanical analyses of technical sports. Students can also focus on the psychological factors that determine sport performance, or on the way in which muscle activation and muscle properties determine maximal neuromuscular output.

When focusing on health, students learn about the restoration of motor function within the context of rehabilitation, as well as the effects of ageing on mobility. To appreciate the influences of various aspects of the movement system, these issues are addressed from a number of perspectives, including coordination dynamics, muscle physiology, and clinical exercise physiology. Students gain insight into the clinical problems associated with neurological diseases as well as degenerative diseases of the skeletal system, and into new possibilities for treatment.

Students opting for the more fundamental aspects of human movement gain insight into state-of-the-art knowledge about neurosciences, molecular biology, mechanobiology, intermuscular load sharing, or the coupling between perception and action. In addition, advanced methodology such as time series analysis, electromyography and 3D kinematics is addressed.

Graduates are expected to understand and conduct the full empirical scientific research cycle: defining a research question, designing a study, collecting data, analysing data and reporting results. In addition, they are expected to utilise their knowledge in the field of human movement sciences.

Graduates are qualified to work as well-versed re- searchers with an independent work attitude, capable of successfully completing a PhD trajectory if aiming for a career in academia, or contributing to R&D in industry or other non-academic institutions. Graduates are expected to tackle timely research questions in the multidisciplinary realm of human movement sciences as well as in fundamental and applied clinical disciplines.

The intended learning outcomes tie in with the domain-specific framework of reference for HMS, which was drawn up by the universities involved in this quality assessment. All Dutch HMS programmes meet twice per year to discuss developments in the field of human movement sciences and sport sciences. The intended learning outcomes are described by the Dublin descriptors.

An advisory board provides a critical external perspective on the programmes of the department and their future, and supports and advises the Programme Directors on current and future activities. The Advisory Board consists of senior academics and representatives from the field of work.

Considerations
Based on the interviews and the examination of underlying documentation, the committee concludes that the intended learning outcomes tie in with (inter)national requirements for this field. The intended learning outcomes are described by using the Dublin descriptors.

The committee concludes that the programme has a broad and multidisciplinary focus on human movement sciences. Within this broad perspective, students can create their own path and profile. In addition, the programme has a strong focus on fundamental academic researchers and educating students for a research career in- and outside academia.

Based on an overview of the relation between courses and intended learning outcomes (as provided in the assessment programme) and the course descriptions, the committee notes that all intended learning outcomes are covered.

The committee appreciates the role of the advisory board. This contributes to the relevance and topicality of the programme.

Based on the above, the committee assesses this standard as **satisfactory**.

2. Teaching-learning environment

The committee concludes that the programme enables students to realise the intended learning outcomes. The programme's focus on fundamental research is reflected in the structure and content of the courses. The programme is very closely tied in with the research of the Amsterdam Movement Sciences research institute and the lecturers involved. This contributes to the strong academic focus and topicality of the courses. The programme offers students ample room for making their own choices within the field of human movement sciences. Regarding these choices, the committee suggests to facilitate meetings between first- and second-year students to share experience regarding the elective courses and to support first-year students in making their choices. The committee appreciates the interactive and small-scale teaching methods used in the programme. This allows for in-depth discussions that meet the level and intensity of a research master programme. The staff is very competent, enthusiastic and involved. Lecturers are very active in research as well. The team of lectures meets on a regular basis to discuss the content of the programme / tracks. Lecturers have ample contacts in research, inside and outside academia, and make these available for their students. The committee notes that the programme applies the legal enrolment criteria. Since the background of international students can be quite diverse, the committee suggests examining ways to equal the background (and level) of students in specific subjects.

Findings

Programme
The first year comprise mandatory and elective courses (3 or 6 EC each). The second year is dedicated to the research internship (60 EC) or the minor/major internship (24/36 EC). The programme is structured in semesters and periods of eight or four weeks.

The programme uses the principles of constructive alignment to ensure the coherence between the learning objectives of the courses, the content of the courses and the assessment methods used.

The first year prepares students for scientific research. The mandatory courses (33 EC in total) include for example courses on exercise and clinical immunology, neurosciences, molecular cell biology and advanced methodology. With the electives, the programme provides room for students to personalise their own track. The electives aim at deepening students' knowledge of current theories, concepts and research methods and techniques in the relevant field. Students can choose from variety of optional courses focusing on, for instance, sport psychology, biomechanics, (clinical) exercise physiology, muscle physiology, coordination dynamics, electromyography or time series analysis. Some of these courses are offered by the other master programmes of the department. Students can also opt for the 'Docentenopleiding' course, that is offered for all master students of the Human Movement Science cluster. In total, approximately 25 students per year enrol in this elective.

The second year is reserved for the research project (60 EC). Students can also opt for a minor/major version, covering 24 EC and 36 EC respectively, in which students broaden their scope by researching two different topics. This is further elaborated on in standard 4.

During the site visit, it became clear that the mandatory course on scientific communication has been added to the programme to prepare students for their research project. From the next academic year, the course will be planned earlier in the programme so students can apply the learned skills also in the other courses.

Students and alumni appreciate the broad and multidisciplinary focus of the programme and the ample opportunities for following their own

interest and deepening their knowledge. Students and alumni notice a slight difference between the elective courses from other master programmes in HMS and the mandatory courses of the research master programme. The latter are more focused on methodology and fundamental research, whereas the first build upon the knowledge learned in the bachelor programme. Students also remarked that they would prefer some more information about the electives, to base their choices on. The information provided in the study guide is quite limited.

Educational concept
The programme's educational concept is characterised by the following educational science principles: a) enabling students to build a solid, up-to-date knowledge base at an excellent academic level, b) encouraging students to accept greater responsibility and to develop an appropriate level of independence, c) offering an academic setting and direct contact with lecturers and researchers, and d) challenging students and stimulating creativity.

Teaching methods used include lectures, practical sessions and/or workgroups, (computer) assignments, excursions or site visits, preparing research proposals and reports, and conducting experiments. With active participation of students in their own learning process the programme aims to quickly familiarise students with the subject matter and to challenge them to perform to the best of their ability.

The site visit showed that students and lecturers value the small scale of the programme and the interactive teaching methods. It allows for in-depth discussions with students. Students however also noted that groups in the electives they attend with students from the other master programmes in HMS are larger.

Intake
The legal enrolment criteria are applicable to the programme. The programme is a selective master programme, with a maximum of thirty students per year. Strict criteria are in place such as students' average grade, the quality of the bachelor / premaster research project, motivation, and proficiency in English. Students' motivation is assessed during an interview. The programme is also open for international students and aims to increase the number of international students enrolling the programme.

Staff
The programme is offered by the HMS department. Lecturers involved often also teach in the other programmes of the Human Movement Science cluster. Almost all coursers are taught by lecturers/researches connected to the Amsterdam Movement Sciences institute. In addition, guest lecturers are involved in the programme. Lecturers are all very active in research; the average Hirsh index is 29. With the close relation between research, education and practice, the programme aims for results of state-of-the-art research to not only be presented but also to be utilised immediately in clinical and sports practice.

The team consists of 18 lecturers. The majority have a BKO (teaching qualification). The electives are offered by lecturers from the RM and other HMS programmes.

Staff meet once a year with the programme director to reflect on the content, quality and consistency of the programme. In addition, the programme director regularly and informally meets with individual staff members.

Students and alumni value the knowledge and approachability of their lecturers. Students remarked that the content of guest lectures sometimes overlaps.

Facilities
The department offers different (new) laboratories, software and equipment for students and staff. Since the programme is closely related to

the Amsterdam Movement Sciences research institute, students can also use laboratories of the related institutions. Canvas is used as a digital learning platform.

Students are primarily guided by their lecturers and their research project supervisor. The study advisor, with a background in human movement sciences, is also available for students. During a career day, alumni are invited to inform students about their potential career path. Every month a renowned scientist is invited to give a presentation at the departmental colloquium, which is open for students. Recently, the programme teamed up with the master programme HMS in creating contacts, for students during their research project, with research departments of companies such as Philips Medical and other producers of technical medical devices.

During the site visit, the committee also met representatives from the programme committee. The programme committee meets on a regular bases, and the programme director is present as hearer. Positive evaluations and points for improvement are discussed with lecturers. The goal is to implement improvements in the ongoing academic year.

Considerations

The committee concludes that the teaching-learning environment and the staff involved enable students to achieve the intended learning outcomes. The programme's focus on fundamental research is reflected in the structure and content of the courses. The programme is very closely tied in with the research of the Amsterdam Movement Sciences research institute and the lecturers involved. This contributes to the strong academic focus and topicality of the courses.

With the broad variety of electives, the programme offers students ample room for making their own choices within the field of human movement sciences.

To support the remark made by students regarding information on the elective courses, the committee suggests facilitating meetings between first- and second-year students where they can exchange information about and experiences with elective courses and other aspects of the programme.

The committee appreciates the interactive and small-scale teaching methods used in the programme. This allows for in-depth discussions that meet the level and intensity of a research master programme. Based on the studied documents, the committee concludes that relevant and up-to-date literature and articles are used in the programme.

The committee notes that the programme applies the legal enrolment criteria. The committee also noted during the site visit that the diverse backgrounds of international students sometimes lead to differences in level in various courses. The committee suggests the programme to examine ways to create a more equal starting point for international students.

During the site visit, the committee met very competent and enthusiastic staff members. Lecturers are very engaged with students and the programme. The committee values that the lecturers are very active in research as well. As said before, this is also reflected in the courses.

The committee concludes that the lecturing team is quite coherent and that lecturers meet on a regular basis to discuss the content of the programme and the relation between courses. Lecturers have ample contacts inside and outside academia, and put these to good use for their students.

Based on the above, the committee assesses this standard as **good**.

3. Assessment

The committee concludes that the programme has an effective assessment system in place. The intended learning outcomes are at the basis of this system. Effective measures are taken to guarantee the validity, reliability and transparency of the assessments, by using an assessment programme, the four-eyes principle and random reviews of assessments and theses by the examinations board. The level of the different assessments studied by the committee during the site visit was high; in addition, the committee appreciates the variety in assessment methods used. The examinations board and its sub-committees are effectively organised and safeguard the quality of the assessments. The committee especially appreciates the varied ways in which the board checks the quality of assessments and theses.

Findings
The programme ties in with the faculty's and university's assessment policy. Based on these policies an assessment programme is drawn up by the programme director. The assessment programme provides an overview of the relation between intended learning outcomes, learning objectives of the courses and assessment methods The programme director is responsible for the assessment processes. The examiner is responsible for the quality of the assessment.

Assessments are developed by examiners appointed for each course. Assessments need to show a clear relation to the learning objectives of the course and didactic activities. Assessment matrices are used to relate the course objectives to the content of an assessment. The faculty aims for a bottom up implementation of the use of assessment matrices; the use of this is not mandatory.
Peer review is obligatory in construction assessments. In practice this means that a colleague evaluates the assessment, the accompanying answer model and the level of difficulty, before the exam is given. This is usually discussed in a meeting with the examiner involved. From next academic year, the names of the examiner and the peer have to be mentioned on the front page of the exam.

Assessment methods used include practical assignments, written exams (with open end questions or multiple-choice questions), oral presentation, written assignments (for example an abstract or research essay), research proposal. In some courses, mid-term practicals or assignments are used to motivate students to study actively. In most courses multiple methods of assessment are used.

Students are informed about the assessments in the study guide, course manuals and during the courses. In addition, representative example questions are available for students. The students the committee met during the site visit are in general satisfied with the level and variety of the assessments.

Examinations board
The faculty examinations board includes three sub-committees for the clusters Psychology, Education & Family Studies and Human Movement Sciences. The board consists of an independent chair, the three chairs of the sub-committees and an examinations expert. In the near future, a legal expert will be added tot the board The sub-committees consist of at least one staff member for each represented programme.

The examinations board is responsible for ensuring the quality, organisation and coordination of the assessments. The board investigates independently and systematically whether the assessment quality meets the criteria as defined in

the faculty's assessment policy. For this, the sub-committee uses the student evaluations regarding assessment, pass rates, and the evaluation and item analysis of multiple-choice exams. The board is also responsible for determining whether students meet the end qualifications of the programme and checks the quality of the master research project and assessments by an annual sample.

The meeting with representatives of the sub-committee HMS and the examinations board during the site visit revealed that the examinations board meets with student representatives twice per year. These meetings are held to receive additional feedback that is not part of the regular evaluations. In addition, assessments results, evaluations and statistical analyses are used for monitoring the quality of the assessments. The sub-committee checks the grades of both assessors of the research projects (theses) on coherence, reliability, average differences, standard deviation and limit of agreement. It was also made clear that lecturers are free to decide on how they provide their students with feedback on their research project (thesis). This can be done orally or by using the assessment form. The examinations board ensures that assessors involved in the assessment of research projects (theses) work together in different compositions, to avoid permanent combinations of assessors. The board is currently working on the implementation of digital assessments and digitalising assessment matrices.

Considerations

The committee concludes that an effective system of assessment is in place. The quality assurance of the assessment system is very solid, proactive and effective measures are taken to guarantee the validity, reliability and transparency of the assessments. The assessment programme, four-eye principle, the systematic checks by examinations board all add to this. The committee appreciates that the full scale of grades is used by the examiners and students can obtain a 10.

Students are satisfied with the level of and variation in assessments. In general, the level of the different assessments studied by the committee during the site visit was high. The committee also values the variation in assessment methods used. The committee encourages the programme to keep promoting the use of assessment matrices; this can contribute to the overall quality of the assessments and can ensure that more assessments also address the application of knowledge.

The examinations board and its sub-committees are very well organised and safeguard the quality of the assessments in a structured and accurate manner. The committee appreciates the variety of analyses the board uses in evaluating the quality of assessments and theses.

Based on the above, the committee assesses this standard as **good**.

4. Achieved learning outcomes

Based on the studied documents and the interviews, the committee concludes that graduates of the research master programme HMS exceed the required level and the intended learning outcomes. The fact that the majority of graduates acquire a PhD position within six months after graduating attests to this finding. In addition, it was confirmed in the meeting with students and alumni that they are very capable of creating their own career path as a PhD or researcher within human movement sciences. The committee concludes that the overall academic quality of the studied theses is very high and agreed with the grades given. The committee notes that the topics of the many projects were of high complexity, challenging the students to such extent that excellent students may surface and are challenged.

Findings

The second year of the programme is fully dedicated to the master research project (60 EC). Students can also opt for a minor / major version (24 / 36 EC). For both versions, the aim is to train students in designing, installing and conducting research on a timely and urgent topic in human movement sciences. This includes devising an experimental setup, collecting and analysing data and reporting the findings in a report conform SCI-journal standards. Students also have to present twice to peers, first their research proposal and second – after the report has been finished – the final outcomes. The latter is part of an annual mini-conference that is held towards the end of the corresponding academic year, that is also open for other attendees.

The research project is conducted within one of the AMS research programmes. These are focused on Sports and Work, Ageing and Morbidity, and Restoration and Development. Students are guided by a supervisor. A second examiner is involved in assessing the research proposal, the final research report and the presentation.

Students choose their topic in consultation with the Research Project coordinator. During the first year, students are advised to participate in the meetings of at least one of the AMS research programmes to prepare the choice of a research topic. After the subject and the supervisor(s) have been assigned, student and supervisor(s) sign a contract. In this contract, student and supervisor agree on the research topic, specific dates for deadlines and the use of equipment. In addition, regulations about data transfer, authorship and disputes are indicated.

Students prepare a research proposal, that is graded. The research proposal induces the aims, approach and theoretical framework within which the project is defined as well as a time plan and the necessary equipment. Besides, students formulate their research hypotheses and explain which experiments and statistical analyses will be applied to test the hypotheses. In the research proposal, the research is also embedded in the current literature. After approval by the two examiners, students present their research proposal during the research master seminars or in a meeting of the corresponding research group.

In the minor and major variant (24 and 36 EC, respectively) students can broaden their scope by investigating two separate research issues. The major research project Is conducted within one of the AMS research programmes. The minor research is conducted at another research institute, preferably abroad.

Two examiners are involved in the assessment of the proposal, the research project and the oral presentation. The research process is assessed by the daily supervisor (first examiner). This

grade contributes 30% to the final grade. Both first and (independent) second examiner grade research proposal and the research report, by means of an assessment form. The first contributes 20% to the final grade, the latter 40%. When the grade of both examiners differs more than one point, the examiners meet and try to reach consensus. If this is not reached, a third examiner is appointed to determine the final grade. Besides, both examiners assess the students oral presentation (10% of the final grade).

The programme stays in contact with alumni through LinkedIn and Facebook. Alumni are invited as guest lecturers and for the annual career day. The majority of alumni have found positions as PhD student within six months after graduation. PhD projects vary from fundamental research in human movement sciences and related fields and applied topics in sport and health, primarily clinic oriented.

During the site visit, students and alumni confirmed their own responsibility in finding a topic for their research project. They feel in general well prepared for the research project and are actively invited to discuss possible topics with their lecturers at an early stage in the programme. The students and alumni had a clear view on their future career opportunities in research.

Considerations
The committee concludes that the programme has an adequate graduation procedure in place. The programme not only prepares students for PhD but also for other research careers in (embedded) research institutes.

The committee reviewed fifteen theses (research reports) of the programme. The committee concludes that the overall quality of the studied theses is very high and graduates of the research master programme HMS exceed the required level. In general, the committee agreed with the grades given. Most of the theses studied were of high quality including advanced measurement and analyses methods. Several but not all thesis topics required the students to address unresolved problems, thereby probing scientific creativity and independent thinking. This approach ensures that even excellent students are sufficiently challenged during the master's thesis and prepares them for pursuing a PhD or other research & development activities. Since the research project is quite comprehensive, the committee stresses the importance of safeguarding the complexity and challenging character of the research projects in the future.

The fact that approximately 80% of the alumni have acquired a position in an academic context within six months after finishing the programme attests to the high level of the programme. The majority enters a PhD-programme within the Netherlands or abroad (often capitalising on the research network of the Amsterdam Movement Sciences research institute, AMS). In addition, the majority of alumni realise a publication based on their research project.

The meeting with students and alumni during the site visit confirmed the high level of the thesis / the programme. The students and alumni the panel met have a clear view on their future and are capable of creating their own career path as an PhD or embedded research the field of human movement sciences.

Based on the above, the committee assesses this standard as **good**.

Appendices

Appendix 1 Assessment committee

Naam panellid (incl. titulatuur)	Korte functiebeschrijving van de panelleden (1-3 zinnen)
prof. dr. Gertjan Ettema	Gertjan Ettema is sinds 1998 professor aan de NTNU, Department of Neuromedicine and Movement Science, Faculty of Medicine and Health Sciences, NTNU, Trondheim. Zijn onderzoeksgebieden zijn biomechanics en (neuro)fysiologie in motor behaviour (in het bijzonder sport) en computer modelling van biomechanica en spierfunctie in coördinatie. Hij doceert en is curriclumontwikkelaar op het gebied van biomechanica, motor control en coordinatie op alle niveaus. Hij is sinds 2014 wetenschappelijk manager van Centre for Elite Sports Reseach en sinds 2013 section editor van Human Movement Sience (sinds 2010 editorial board member). Daarnaast is hij lid van de International Society of Biomechanics (ISB) en de European College of Sport Science (ECSS). In de jaren 2000 was hij professor II aan Norges Idretts Høgskole Oslo; in de jaren '90 docent aan de University of Queensland, Australië en de VU Amsterdam. In Australië heeft hij een cursus voor Problem-based-learning facilitator in the Medical Curriculum gevolgd.
prof. dr. Anton Wagenmakers	Anton Wagenmakers is sinds 2012 professor of Exercise Metabolism and Lead of Exercise Metabolism & Adaptation Research Group aan Liverpool John Moores University. Anton is voorzitter van de werkgroep curriculumontwikkeling BSc Sport and Exercise Science en moduleleider en examinator in de MSc Sport and Exercise Physiology. Daarvoor was hij 10 jaar lang als Professor of Exercise Biochemistry verbonden aan University of Birmingham, sinds 2008 als & Head of School of Sport & Exercise Sciences. In Nederland had hij van 2003-2007 een parttime leerstoel in Metabolic Control Systems, Faculty of Biomedical Engineering aan de TU/e en was hij tot 2003 verbonden aan de UM. Bij UM was hij tutor en examinator van bachelortheses en lid van voortgangstoets Beoordelingscommissie. Van 1999-2003 was hij lid van de Examencommissie BMT aan de TU/e.
prof. dr. Nicole C. Wenderoth	Nicole Wenderoth is sinds 2012 full professor Neural Control of Movement en directeur van het Institute for Human Movement Science and Sport, Department of Health Sciences and Technology, ETH Zürich, Zwitserland. Hier geeft zij leiding aan een multidisciplinaire onderzoeksgroep. Zij is lid van de ETH Onderzoekscommissie, lid van de Stuurgroep Neuroscience Centre Zürich, wetenschappelijk bestuurslid van zowel de Hochschulmedizin Zürich als van de European College of Sport Sciences. Zij treedt regelmatig

	op als reviewer van internationale fondsen en van journals op het gbeied van Neuroscience, Neuroimaging en Motor Control. Tot 2012 was zij verbonden aan KU Leuven als assistant professor. Zij is promotor van tot nu toe 20 afgeronde promotietrajecten en heeft meerdere wetenschappelijke prijzen in ontvangst mogen nemen, zoals in 2013 de Golden Owl for excellent teaching; in 2006 een professorship with specific research assingment (competitive position awarded for 10 years).
Vera L. Broek, student-lid	Vera Broek studeert Biomedische Wetenschappen aan LUMC en Klassieke Muziek aan Codarts University of the Arts. Zij is student-assistent bij microscooppractica in het LUMC en studentvertegenwoordiger in de minor Cellular Therapies in Biomedical Sciences. Zij treedt op als student-lid van visitatiepanels voor TNO's en was in 2016-2017 panellid ZonMw (Lyme Disease).
drs. Raoul R. van Aalst	Raoul van Aalst is bedrijfskundige van achtergrond. Na afronding daarvan is hij werkzaam geweest in zowel controllersfuncties als adviesfuncties. Sinds 2005 vervult hij de functie van controller bij Tennet. Sinds 2016 is hij programmamanager Always Energy, een gezondheids- en vitaliteitsprogramma dat erop gericht is om een gezonde levensstijl bij medewerkers te bevorderen. Hij is sinds 2004 frequent betrokken bij uitvoeren van visitaties in het hoger onderwijs, zowel in de rol van extern deskundige als in de rol van voorzitter. In oktober 2018 verwacht hij de module "Assessment in Higher Education" bij de Erasmus Universiteit Rotterdam (Risbo) af te ronden.

The panel was supported by Titia Buising, secretary. All panel-members signed a declaration of independence and confidentiality, which were submitted to NVAO.

Appendix 2 Programme site visit

Tuesday January 22

12.00 -13.00 hours:	Arrival panel
13.00 – 13.30 hours:	Management
13.30 – 14.30 hours:	Guided tour
14.45 – 15.30 hours:	Examinations Board
15.45 - 16.45 hours:	Lecturers master programme Human Movement Science
16.45 - 17.45 hours	Students and alumni master programme Human Movement Sciences

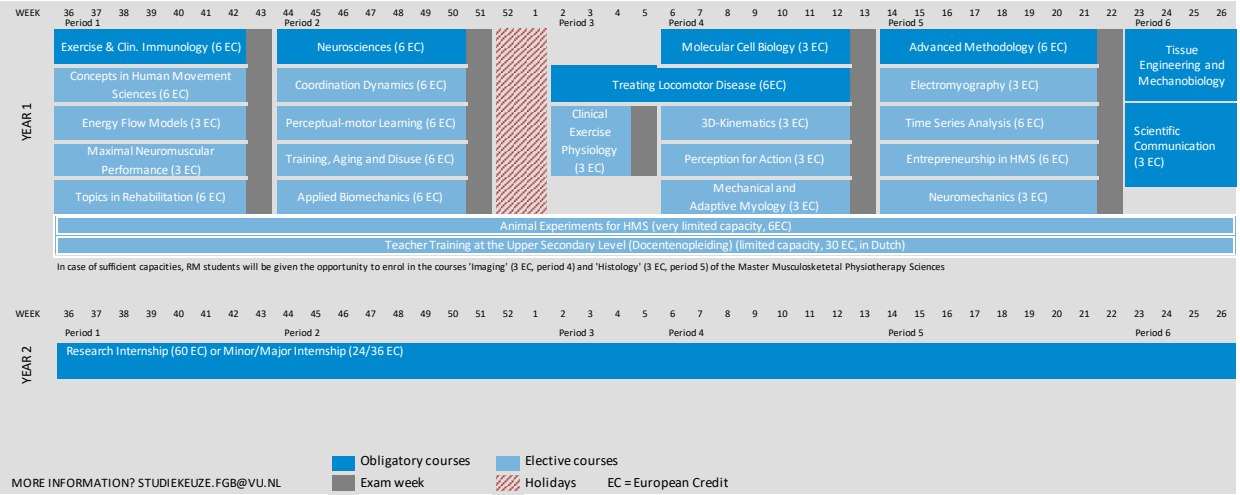
Wednesday January 23

9.00 - 10.00 hours:	Lecturers bachelor programme Human Movement Sciences
10.00 - 11.00 hours:	Students and alumni bachelor programme Human Movement Sciences
11.15 - 12.15 hours:	Lecturers master programme Musculoskeletal Physiotherapy Sciences
12.15 – 13.15 hours:	Students and alumni master programme Musculoskeletal Physiotherapy Sciences
13.15 – 14.00 hours:	Lunch
14.00 – 15.-00 hours:	Lecturers bachelor programme RM Human Movement Sciences
15.00 – 16.00 hours:	Students and alumni RM Human Movement Sciences
16.00 – 18.00 hours:	Internal meeting panel
18.00 – 18.15 hours:	Feedback session

Appendix 3 Intended learning outcomes

knowledge and insight	application knowledge and insight	judgement formation	communication	learning skills	
1					Knowledge of and insight into current research questions with regard to biological, biomechanical, (neuro)physiological and psychological aspects of healthy and pathological human movement, including their historical background
2					The ability to formulate plans, including set-ups, methods, procedures and analyses, for tackling research questions
3					The ability to perform complex analyses of kinetic, kinematic and physiological data derived from human movement
4					The ability to apply and to write or customize computer programs to collect, order and analyse human movement data
5					Knowledge of advanced research techniques and methods used in the study of human movement
	6				The ability to integrate knowledge from different disciplines (e.g., biology, biomechanics, functional morphology, physiology, neuroscience and psychology) relevant human movement sciences
	7				The ability to apply knowledge human movement sciences to frame and answer research questions relevant to this field of study
	8				The ability to design and conduct experimental research in the field human movement sciences
	9				The ability to evaluate the methods used and the results obtained in studies on human movement
		10			Insight into the scientific relevance and societal value of research achievements in the field of study
		11			The ability to reflect on social and ethical issues pertaining to the dissemination and application of research results
			12		The ability to comprehensively and appealingly present results and interpretations thereof to a specialist and non-specialist audience
			13		The ability to write a scientific report in the form of a scientific (peer-reviewed) paper
			14		The ability to contribute to scientific discussions about research plans and results
			15		The ability to communicate with experts from different disciplines and to form links between disciplines
			16		The ability to work in an interdisciplinary and intercultural research environment
				17	The ability to reflect on one's own learning skills and abilities
				18	The ability to evaluate one's functioning, and to formulate final aims
				19	Working experience in a research environment and awareness of one's own scientific weaknesses and strengths
				20	The ability to autonomously collect scientific information and to analyse and evaluate this information critically
				21	The ability to acquire new skills and knowledge

Appendix 4 Overview of the programme



Appendix 5 Studied documents

The panel studied prior to the site visit fifteen theses of graduates
The panel studied during the visit the following documents (partly in hard copy and partly digital):

- Annual report Education of the Faculty of Behavioural and Movement Sciences 2016-2017
- Annual report Examinations Board FGB 2017-2018
- Annual report research master programme Human Movement Sciences 2017-2018
- Annual report of the Programme Committee 2017-2018
- Notes on meetings on establishment Examinations Board
- Notes on cluster meetings Human Movement Sciences
- Notes on educational meetings (FGB and programmes Human Movement Sciences)
- Notes on meetings with advisory board HMS
- Notes on meeting with chairs of the Programme Committees HMS
- Assessment Policy FGB
- Assessment programmes HMS
- Assessment forms thesis and research projects
- Teaching and Examination Regulations of the programmes of HMS
- List of used literature in the programmes of HMS
- Study guide of the programmes of HMS

Assessments and answering models of the following courses of the bachelor programme Human Movement Sciences:

- Neurosciences
- Neuromechanics
- Scientific Communication