

MASTER'S PROGRAMME
HISTORY AND PHILOSOPHY
OF SCIENCE

FACULTY OF SCIENCE

UTRECHT UNIVERSITY

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This report was finalized on 4 October 2019



REPORT ON THE MASTER'S PROGRAMME HISTORY AND PHILOSOPHY OF SCIENCE OF UTRECHT UNIVERSITY

This report takes the NVAO's Assessment Framework for the Higher Education Accreditation System of the Netherlands for limited programme assessments as a starting point (September 2018).

ADMINISTRATIVE DATA REGARDING THE PROGRAMME

Master's programme History and Philosophy of Science

Name of the programme:	History and Philosophy of Science
CROHO number:	60711
Level of the programme:	master's
Orientation of the programme:	academic
Number of credits:	120 EC
Specializations or tracks:	-
Location:	Utrecht
Mode of study:	full time
Language of instruction:	English
Submission deadline NVAO:	01/11/2019

The visit of the assessment panel Physics and Astronomy to the Faculty of Science of Utrecht University took place on 4 and 5 June 2019.

ADMINISTRATIVE DATA REGARDING THE INSTITUTION

Name of the institution:	Utrecht University
Status of the institution:	publicly funded institution
Result institutional quality assurance assessment:	positive

COMPOSITION OF THE ASSESSMENT PANEL

The NVAO has approved the composition of the panel on 14 January 2019. The panel that assessed the master's programme History and Philosophy of Science consisted of:

- Prof. dr. R. (Reinder) Coehoorn, full professor at the Eindhoven University of Technology, on the Physics and Application of Nanosystems. He is affiliated to the research group Molecular Materials and Nanosystems, in the Department of Applied Physics [chair];
- Prof. dr. M.J. (Margriet) Van Bael, professor at the Department of Physics and Astronomy of the Faculty of Science of KU Leuven (Belgium);
- Prof. dr. G. (Garrelt) Mellema, professor and programme director at the Department of Astronomy of Stockholm University (Sweden);
- Prof. dr. S. (Sjoerd) Stallinga, professor and head of the Department Imaging Physics of Delft University of Technology;
- Prof. H. A.J. (Harro) Meijer, professor of Isotope Physics, chairman of the Centrum voor Isotopen Onderzoek (CIO) and director of the Energy and Sustainability Research Institute Groningen at University of Groningen;
- Prof. G. (Geert) Vanpaemel, professor for History of Science and Science Communication at KU Leuven, Belgium;
- B. N. R. (Bram) Lap BSc, master's student Astronomy at University of Groningen;

The panel was supported by P. (Peter) Hildering MSc, who acted as secretary.



WORKING METHOD OF THE ASSESSMENT PANEL

The master's programme History and Philosophy of Science at the Faculty of Science of Utrecht University was part of the cluster assessment Physics and Astronomy. Between April 2019 and June 2019 the panel assessed 17 programmes at 5 universities.

Panel members

The panel consisted of the following members:

- Prof. dr. R. (Reinder) Coehoorn, full professor at the Eindhoven University of Technology, on the Physics and Application of Nanosystems. He is affiliated to the research group Molecular Materials and Nanosystems, in the Department of Applied Physics [chair];
- Prof. dr. M.J. (Margriet) Van Bael, professor at the Department of Physics and Astronomy of the Faculty of Science of KU Leuven (Belgium);
- Prof. dr. G. (Garrelt) Mellema, professor and programme director at the Department of Astronomy of Stockholm University (Sweden);
- Prof. dr. S. (Sjoerd) Stallinga, professor and head of the Department Imaging Physics of Delft University of Technology;
- Prof. H. A.J. (Harro) Meijer, professor of Isotope Physics, chairman of the Centrum voor Isotopen Onderzoek (CIO) and director of the Energy and Sustainability Research Institute Groningen at University of Groningen;
- Prof. G. (Geert) Vanpaemel, professor for History of Science and Science Communication at KU Leuven, Belgium;
- J. (Jeffrey) van der Gucht BSc, master's student Physics and Astronomy at Radboud University [student member];
- B. N. R. (Bram) Lap BSc, master's student Astronomy at University of Groningen [student member];
- L. (Laura) Scheffer BSc, master's student Physics at Utrecht University [student member].

For each site visit, assessment panel members were selected based on their expertise, availability and independence.

The QANU project manager for the cluster assessment was Peter Hildering MSc. He acted as secretary in the site visit of Leiden University and Utrecht University. In order to assure the consistency of assessment within the cluster, the project manager was present at the panel discussion leading to the preliminary findings at all site visits and reviewed all draft reports. Dr Barbara van Balen acted as secretary in the site visits of University of Groningen and the joint degrees in Amsterdam. Drs Mariëtte Huisjes was secretary at Radboud University. The project manager and the secretaries regularly discussed the assessment process and outcomes.

Preparation

On 24 January 2019 the panel chair was briefed by the project manager on the tasks and working method of the assessment panel and more specifically his role, as well as use of the assessment framework.

A preparatory panel meeting was organised on 15 March 2019. During this meeting, the panel members received instruction on the tasks and working method and the use of the assessment framework. The panel also discussed their working method and the domain specific framework.

A schedule for the site visit was composed. Prior to the site visit, representative partners for the various interviews were selected. See Appendix 4 for the final schedule.

Before the site visit, the programmes wrote self-evaluation reports of the programmes and sent these to the project manager. He checked these on quality and completeness, and sent them to the panel members. The panel members studied the self-evaluation reports and formulated initial questions and remarks, as well as positive aspects of the programmes.

The panel also studied a selection of theses. The selection consisted of 15 theses and their assessment forms for the programmes, based on a provided list of graduates between 2017-2018. A variety of topics and tracks and a diversity of examiners were included in the selection. The project manager and panel chair assured that the distribution of grades in the selection matched the distribution of grades of all available theses.

Site visit

The site visit to Utrecht University took place on 4 and 5 June 2019.

At the start of the site visit, the panel discussed its initial findings on the self-evaluation reports and the theses, as well as the division of tasks during the site visit.

During the site visit, the panel studied additional materials about the programmes and exams, as well as minutes of the Programme Committee and the Board of Examiners. An overview of these materials can be found in Appendix 5. The panel conducted interviews with representatives of the programmes: students and staff members, the programme's management and representatives of the Board of Examiners. It also offered students and staff members an opportunity for confidential discussion during a consultation hour. No requests for private consultation were received.

The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the panel's preliminary findings and general observations.

Report

After the site visit, the secretary wrote a draft report based on the panel's findings and submitted it to another project manager for peer assessment. Subsequently, the secretary sent the report to the panel. After processing the panel members' feedback, the secretary sent the draft reports to the faculty in order to have these checked for factual irregularities. The secretary discussed the ensuing comments with the panel's chair and changes were implemented accordingly. The report was then finalised and sent to the Faculty of Science and University Board.

Definition of judgements standards

In accordance with the NVAO's Assessment framework for limited programme assessments, the panel used the following definitions for the assessment of the standards:

Generic quality

The quality that, from an international perspective, may reasonably be expected from a higher education Associate Degree, Bachelor's or Master's programme.

Meets the standard

The programme meets the generic quality standard.

Partially meets the standard

The programme meets the generic quality standard to a significant extent, but improvements are required in order to fully meet the standard.

Does not meet the standard

The programme does not meet the generic quality standard.

The panel used the following definitions for the assessment of the programme as a whole:

Positive

The programme meets all the standards.



Conditionally positive

The programme meets standard 1 and partially meets a maximum of two standards, with the imposition of conditions being recommended by the panel.

Negative

In the following situations:

- The programme fails to meet one or more standards;
- The programme partially meets standard 1;
- The programme partially meets one or two standards, without the imposition of conditions being recommended by the panel;
- The programme partially meets three or more standards.

SUMMARY JUDGEMENT

The master's programme History and Philosophy of Science convincingly profiles itself as a unique programme that combines history and philosophy with a critical-reflective attitude towards science as a whole. The meta-science perspective, in which students investigate the foundations of science and its role in society, allows them to develop their skills as critical thinkers, which is very much valued by students and alumni. The ILOs are fitting for an academic master's programme in terms of level and orientation and are kept aligned with the field by a comparison with related programmes. The panel considers the interdisciplinarity of the programme and its roots in the sciences to be unique strengths, and recommends carefully monitoring and investigating any trends in changes in inflow, and considering extra efforts to keep the inflow of students from the Faculty of Science on a stable level.

The teaching-learning environment of the programme facilitates students achieving the intended learning outcomes. The mandatory part of the programme provides a very solid overview of the basic knowledge, understanding and, most prominently, skills required by graduates. This guarantees that all students can develop their skills equally, regardless of their choice of electives. The electives offer students the opportunity to deepen their knowledge and skills, and provide them with a large amount of flexibility and choice in composing their own curriculum. The students are provided with personal guidance throughout their curriculum, assisting them to compose a feasible and coherent programme. The teaching methods are very interactive and focus heavily on developing personal and academic skills, fitting the programme's goals. The panel sees room for additional improvement by considering more interaction between students and the research department during the final master's project phase. It is satisfied with the extra investments the programme has made in career orientation and suggests that the programme might add to this with extra electives on science communication and science and technology studies.

The programme is offered by an interdisciplinary teaching staff from various faculties brought together in the Descartes Centre and organized by a highly motivated core staff. The teachers are qualified and create a stimulating, open environment for students. The programme invests in the professionalization of the teaching staff, which is particularly visible in the high percentage of STQ-certified staff members. The feasibility of the programme is adequate, although students often take longer to finish their programme due to their wide interests. The programme has invested in streamlining the master's thesis timeline, which the panel expects to lead to less delay in this part of the programme. The panel fully supports the use of English in this master's programme and thinks that this is the obvious choice in light of the programme's goals.

The master's programme HPS has an adequate assessment system that assesses the students on all ILOs. A quality assurance system with frequent sampling to determine the quality of assignments and the final project enhances the validity and transparency of student assessment. The assessment methods focus on academic skills such as writing and presenting, with which teachers give students extensive feedback. The master's project is always assessed by two examiners, and the internship is always graded by an internal examiner. The associated assessment form could be improved by making the role of the second examiner more visible, for instance by including the grades of the two examiners separately. For the internship, the panel recommends ensuring that professional internships always have a clearly defined project goal. It recommends including software for automated plagiarism detection for the written assignments in the programme, and especially for the final research project.

The Board of Examiners adequately fulfils its role in the quality assurance of assessment. The panel thinks that this fits the university's educational philosophy, in which students often follow courses in other programmes. A more centralised system of assessment and a central Board of Examiners allows for more coherence in assessment between the individual programmes.



The panel concludes that the final projects of the master's programme HPS are of a good quality, and convincingly show that the intended learning outcomes of the programme are achieved by the students. This is further demonstrated by the high number of students who start a PhD and the good job perspectives of all students.

The panel assesses the standards from the *Assessment framework for limited programme assessments* in the following way:

Master's programme History and Philosophy of Science

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

The chair, prof. Reinder Coehoorn, and the secretary, Peter Hildering MSc, of the panel hereby declare that all panel members have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 4 October 2019

DESCRIPTION OF THE STANDARDS FROM THE ASSESSMENT FRAMEWORK FOR LIMITED FRAMEWORK ASSESSMENTS

Standard 1: Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

Mission and vision

The master's programme History and Philosophy of Science (HPS) of Utrecht University is embedded within the Faculty of Science. It is supported by the Descartes Centre for the History and Philosophy of the Sciences and the Humanities, the university-wide collaboration on education and research in this field across all faculties. Within the Faculty of Science, the master's programme HPS is part of the Graduate School of Natural Sciences (GSNS), together with all the other master's programmes at the faculty. The GSNS organizes the quality control of the programme, at the level at which the Educational Council and the Board of Examiners is organized. In its educational programmes, Utrecht University values freedom of choice by students and provides them with the opportunity to adapt their curriculum to their individual goals. The centralized system of quality assurance is aimed at facilitating students to follow educational components from other degree programmes. The programme has a stable inflow of approximately 20-25 students per year.

HPS aims to train its students to take a critical stance with respect to the foundations of science and, as a result, enable them to contribute in their future jobs to the societal debate on the role and functions of science in society. They should be able to understand different ways of knowing, and to assess the strengths and weaknesses of each approach and its relevance in different situations. Within the programme, students investigate the grounds on which scientists base what they say, how they justify what they do, and how the work of scientists affects society. The programme has a very broad scope: students are enabled to develop their own intellectual interest within the field and are offered considerable freedom to follow their intellectual aims and career ambitions. It has no pre-defined tracks; each student composes his or her personal curriculum. It does offer core sets in history, philosophy and the foundations of science, but the students are not required to choose one of these fields to specialize in. It has a predominant research orientation but recognizes that students often pursue other career paths in, for instance, journalism, science communication or policy making, and aims to support them with internships and electives to explore these alternatives.

The panel is positive about the programme's unique profile, which combines history and philosophy with a critical-reflective attitude towards science as a whole. The meta-science perspective, in which students investigate the foundations of science and its role in society, allows them to develop their skills as critical thinkers. The panel considers a flexible curriculum fitting to this approach, as it allows students with very diverse backgrounds to develop themselves on an individual level. These elements were also very much valued by the students and alumni the panel interviewed. Some call the programme a period of *Bildung*, in which they have the time and opportunity to develop themselves as critical thinkers, a development which they take with them for the rest of their professional career as well as their personal life.

Science and humanities

The embedding of the HPS programme within the Faculty of Science is foremost historical: the programme originally emerged from a philosophical track within the master's programme Physics. Although the foundations of the natural sciences still form a major theme within the programme, the programme has become increasingly interdisciplinary and currently focuses on the history and philosophy of the humanities as well as science. The inflow of students with a humanities background currently matches or exceeds the number of students with a science background, which has gradually dropped from 10 in 2014 to 5 in 2018. During the site visit, the panel discussed with the programme



the extent to which the apparent shift towards humanities is considered desirable by the programme. The programme indicated that it is not yet convinced that there is a shift: although the number of students with a science background has indeed dropped, the number of students with a broad bachelor's degree with an orientation towards science has been on the rise. Moreover, due to the small numbers, it is hard to discern trends in general. With that being said, the programme does value its diverse inflow and would like to maintain the balance between science and humanities within the programme.

The panel agrees with this, and considers the interdisciplinarity of the programme and its roots in the sciences as unique strengths. It recommends that the programme carefully monitor and investigate any trends in changes in inflow, and consider making extra efforts to keep the inflow of students from the Faculty of Science on a stable level. It also notes that the programme, although being offered in a context of natural sciences, does not bring students in touch with the natural sciences itself. The programme could consider making an introduction to the natural sciences part of its introduction for students with a humanities background. The panel understood from alumni that hands-on experience in a laboratory used to be a part of the programme's first weeks for humanities students, but that this was dropped for practical reasons. It thinks that this was a very good addition to the programme to allow students to connect with the Faculty of Sciences, and recommends investigating the possibilities to offer a similar experience to its students.

Intended learning outcomes

The programme has formulated its intended learning outcomes (ILOs) along the lines of the five Dublin descriptors for academic master's programmes and lists for each one which knowledge, understanding and skills it expects its students to achieve at the end of their programme. The ILOs are a programme-specific translation of the faculty-wide learning outcomes of the GSNS. They are evaluated each year by the programme management under the auspices of the GSNS to check whether they are still accurate and up-to-date. Due to its unique position, there is no national or international framework of reference for the aims and learning outcomes of the programme. To keep its ILOs aligned with the expectations of the field, the HPS programme compares itself to a number of programmes on history and/or philosophy of science within the Netherlands as well as in Europe. By regularly listing the ILOs and contents of these programmes and comparing itself to them, HPS checks whether its ILOs are still up to date.

The panel studied the ILOs of the programme. It deems them appropriate and insightful for the programme. They clearly reflect the main focus of the programme on developing a critical attitude, and the associated skills of reading, writing and engaging in academic debates. It also includes specific ILOs for academic integrity and preparation for the labour market, which the panel values. The academic orientation and master's level are visible through the link with the Dublin descriptors, and through the inclusion of the aforementioned academic skills, which are clearly on an academic master's level. According to the panel, annual evaluation of the ILOs on the level of the GSNS and the regular comparison to similar programmes in Europe is an effective way of keeping them up-to-date and aligned with the field.

Considerations

The master's programme History and Philosophy of Science convincingly profiles itself as a unique programme that combines history and philosophy with a critical-reflective attitude towards science as a whole. The meta-science perspective, in which students investigate the foundations of science and its role in society, allows them to develop their skills as critical thinkers, which is very much valued by students and alumni. The ILOs are fitting for an academic master's programme in terms of level and orientation and are kept aligned with the field by a comparison with related programmes. The panel considers the interdisciplinarity of the programme and its roots in the sciences to be unique strengths, and recommends carefully monitoring and investigating any trends in changes in inflow, and considering extra efforts to keep the inflow of students from the Faculty of Science on a stable level.

Conclusion

Master's programme History and Philosophy of Science: the panel assesses Standard 1 as 'meets the standard'.

Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Curriculum

The 120 EC master's programme HPS has a shared core of mandatory courses (30 EC), accompanied by primary electives (30 EC) and secondary electives (7.5 EC). They take up the first year and a small part of the second year. The remaining 52.5 EC in the second year are spent on either a large master's research project or a smaller research project (37.5 EC) accompanied by an internship (15 EC). In addition, there are two small shared courses within the GSNS: Introduction to Natural Sciences and the scientific integrity course, Dilemmas of the Scientist (0.5 EC each).

The *mandatory courses* consist of three core courses in the field: History of the Natural Sciences, History of the Humanities, and Philosophy of Science. There is also the research seminar that runs throughout the year, in which students attend a reading group on either History of Science, Philosophy of Science, or Philosophy of Physics, and read and discuss recent developments in that field with fellow students. The *primary electives* are meant to give students the opportunity to acquire in-depth knowledge in a specific area within HPS. They can be selected from a list defined by the programme management each year and are offered by either the programme's core staff or the Descartes Centre teaching staff. Most courses are research-oriented, but some focus on a societal career, such as Science in Society and Investigative Journalism, which is offered in collaboration with journalists from the bureau for investigative journalism *Investico*, who regularly publish in, among others, the magazine *De Groene Amsterdammer*. The *secondary electives* allow students to gain knowledge and skills outside the framework of the master's programme. This slot can also be used to repair deficiencies with regard to the student's bachelor's degree. In the second year of their curriculum, the students undertake their *master's research project* (37.5-52.5 EC), in which they carry out an individual research project that adds to an academic debate within the field. They can choose their own topic and a supervisor from within the Descartes Centre, who provides guidance and feedback. The *internship* is intended for students to experience a specific working environment inside or outside academia, for instance at government institutions or a museum. The programme facilitates a number of deviations from the programme structure. Students can opt for 15 EC of extra courses to replace the internship, which is meant to give students the opportunity to study abroad for one period, or to replace primary electives with secondary electives if specialized expertise is required for the master's research project. Students can also choose a more structured 30 EC profile in Education, Complex Systems, or Applied Data Science, which replaces their secondary electives and 15 EC of the internship.

Students are free to choose their preferred programme structure. There are frequent consults between each student and the programme coordinator in which they discuss the student's progress and preferred study path. Students also often consult their prospective thesis supervisor for advice to determine a set of coherent electives that tie in to the topic of their preferred master's research project. Academic skills are interwoven throughout the entire curriculum and are addressed in practically every course. The three mandatory courses and the research seminar play an integral role in skills education, as they serve to provide students with the essential skills along with the basic knowledge and understanding in the field. These include close reading, literature and archival research, academic writing, and oral presentation skills. The students are required to attend at least 20 academic colloquia offered by the Descartes Centre or elsewhere on HPS-related topics to participate actively in academic life. In response to recommendations from the previous accreditation



panel, the programme invested in career orientation. It has added primary electives focusing on non-academic contexts (as discussed above), added the primary elective Professional Skills and Identity devoted to career orientation, invites alumni to speak about their careers, and has expanded the opportunities for the internship to include professional environments. Finally, the faculty has appointed a career officer who helps students orient themselves towards their future career.

The panel studied the curriculum of the programme and the content of several courses, and believes that the students are offered a very broad range of courses to develop their personal skills as critical thinkers. It values the amount of flexibility and choice offered to the students to compose their own curriculum, and deviate from the standard curriculum if they prefer to do so. The mandatory part of the programme provides a very solid overview of the basic knowledge, understanding and, most prominently, skills required for graduates. This guarantees that all students can develop their skills equally, regardless of their choice of electives. The panel praises the programme for the careful design of the curriculum in this aspect, which addresses the importance of academic skills in relation to the programme's goals. It thinks the extra effort in career orientation through electives and the internship is a good development and accommodates students who want to continue their career outside academia. It noticed that many graduates find employment in science communication or science policy (see Standard 4). It thinks the students might benefit from electives in science communication or science and technology studies to prepare them for such a career, which was confirmed by students' comments in the student chapter of the self-evaluation report. The programme agrees with this, but notes that it currently has no expertise available within the teaching staff on these topics. The panel recommends keeping an eye open for opportunities to develop such courses.

Another topic brought up in the student chapter was the fact that the programme offers no course on continental and non-Western philosophy. According to the programme, Utrecht University (and by extent the Descartes Centre) historically profiled itself with an analytical profile. In recent years the scope has become broader, but the analytical origin is still visible within the curriculum. The programme states that students are offered some continental philosophy within other courses in the programme, and that they can pursue this further in electives outside the university. According to the panel, this is a sensible choice that gives students the freedom to explore their interests while staying true to the profile of the Descartes Centre.

Didactics

The didactics of the HPS programme very much rely on the development of the personal skills necessary for reflection, discussion and criticism. In the courses, teachers and students discuss the teaching materials, with which the students are stimulated to develop and defend their own views and opinions. They are often requested to give presentations and write essays based on the course materials, for which they receive feedback from their teachers that they can use to improve their skills. The programme strives to create an atmosphere in which all students feel safe to contribute to discussions.

The panel is very positive about the programme's didactics. The teaching methods are very interactive and help students to develop their personal skills to become critical thinkers through group discussions, reading and writing with extensive feedback. This closely fits the programme's goals of developing students to take a critical stance in the societal debate on the role and function of science, and to contribute to this debate themselves in their future career. Both students and teaching staff indicated to the panel that they are very satisfied with these teaching methods, which contribute greatly to the development of essential skills. The relatively small student numbers are essential for the success of this small-scale, interactive teaching. As recognized by the programme management, this means that the programme cannot grow bigger than 30 to 40 students per year without compromising its educational quality. The panel supports this and thinks that the programme is right in this observation and should not aim to increase its inflow any higher than this number.

In the final research project, the students carry out an independent research project contributing to academic debates within the field of HPS. They are individually guided and supervised by an active researcher from the Descartes Centre, who can be from any faculty within Utrecht University. The students are not usually embedded in the research groups during the course of their project, but carry out their project individually. The panel discussed with the programme management why the students are not embedded in a research group, as is the case in the master's programme Physics for instance. This would allow students to get acquainted with academic research in a master-apprentice relationship. The programme indicated that it does not expect all students and staff to appreciate this, as the research culture of the humanities is more focused on individual research projects. Also, not all of the associated faculties have the necessary facilities to accommodate this. The panel understands these reasons but also thinks that learning through interaction with researchers and other students would fit the programme's goals, as it does in the courses. It recommends investigating possibilities to create additional facilities for interaction between students and researchers during the final master's project. It suggests creating a shared working space for students working on their research project in the proximity of research departments associated with the HPS programme.

Teaching staff

The teaching staff of the programme is affiliated with the Descartes Centre for the History and Philosophy of Science and Humanities, a virtual centre within Utrecht University that includes researchers from all faculties. The programme is organized by a small core staff affiliated with the Freudenthal Institute within the Faculty of Science, which also provides the mandatory courses and some of the primary electives. The core staff meets regularly to discuss the courses and their alignment. The secondary electives and the supervision of research projects are provided by the broader group of teaching staff in the Descartes Centre. The programme aims to have all teachers acquire the University Teaching Qualification (UTQ) and encourages obtaining the Senior Teaching Qualification (STQ) as well. Currently, 90% of the staff holds an UTQ and 40% a STQ.

The panel is very positive about the teaching staff of the programme. They are active researchers and qualified teachers in the field of HPS and, as a result, are able to introduce state-of-the-art insights into the academic debate within their course. They are interdisciplinary and include experts studying history and philosophy of science from many different perspectives and disciplines. The students the panel interviewed praised the didactic quality, openness and availability of their teachers. They are able to create a stimulating, open environment in which the students can develop themselves. Considering that the years within the programme are often very formative ones for the students on a personal level, the students often feel the need to discuss issues concerning their personal development with their teachers. They feel their teachers and especially the programme management are always open to this and help them whenever possible. The panel considers the creation of this open, personal environment a major accomplishment which is very beneficial for the students. It also compliments the programme on the high level of professionalization of the teaching staff, which is expressed in the high percentage of UTQs.

Feasibility

The master's programme HPS has an average study duration of 30-36 months. The programme attributes this long study duration to two factors. Firstly, students experience the programme as a time of *Bildung* in which they pursue their intellectual interests and take time to think about what they want in life. They do not feel the need to rush towards the end and often take more electives than they strictly need. Students and alumni confirmed this to the panel, and indicated that they often considered the time spent in the programme as personal development in which they would gladly invest more than the required time. The second reason for delay is the often long duration of the thesis project. Based on the recommendations of the previous accreditation panel, the programme has introduced measures to counter this. It imposed a word limit as well as a stricter thesis procedure, starting with the 2017 cohort. Students have to start their project by filling out a Research Application Form detailing their project and the associated timeline, which has to be approved by the supervisor. If the student does not complete the thesis by the agreed deadline, s/he



receives a maximum of a 8 (out of 10) on his or her work, which means that a *cum laude* is no longer possible. It is still too early to see the results of this policy, but the programme expects an improvement in the number of students completing their thesis on time.

The feasibility of the programme for individual students is already considered in the admission to the programme. Students with an academic bachelor's degree in any field are admitted to the programme as long as they have a demonstrable interest in HPS (for instance through courses followed during their bachelor's programme), a well-argued motivation and sufficient analytical and writing skills as demonstrated in a writing sample. An Admission Committee of GSNS, advised by four staff members of the HPS programme, decides if a student is to be admitted, when it assesses that s/he can finish the programme within a reasonable time and has the right expectations of the programme. The mandatory courses give students a crash course in the essentials of the programme, which can be experienced as quite intense, but ensures that they all obtain the required skills to complete the rest of the curriculum. They can be advised by the programme coordinator to follow extra courses to remedy any remaining deficiencies as secondary electives. They can also follow an extracurricular academic writing tutorial offered by the Descartes Centre to train this essential skill.

The panel concludes that the curriculum is feasible and that the programme has taken adequate measures to improve the feasibility, in particular for the master's project. The admission criteria and the mandatory courses ensure that the students acquire the skills necessary to complete the programme. The students are satisfied with the feasibility of the programme and see no major obstacles within the curriculum. They feel well supported by their teachers, programme management and the study advisor, and can approach them for any study-related problems, which the teachers try their best to resolve.

Language and internationalization

The teaching language of the programme is English, which is the common language for research in the field of HPS, and therefore essential for a research-oriented programme. Approximately 25% of the student population and one-third of the teaching staff is non-Dutch, which adds to the international character of the programme. The programme values this international classroom and encourages the students to spend part of their study abroad, for instance by following courses or doing research at a university abroad, visiting conferences or making other short research trips. As active researchers in the field, all members of the teaching staff have sufficiently mastered the English language. The panel fully supports the use of English in this internationally oriented master's programme and thinks that this is the obvious choice in light of the programme's goals.

Considerations

The teaching-learning environment of the programme facilitates students achieving the intended learning outcomes. The mandatory part of the programme provides a very solid overview of the basic knowledge, understanding and, most prominently, skills required by graduates. This guarantees that all students can develop their skills equally, regardless of their choice of electives. The electives offer students the opportunity to deepen their knowledge and skills, and provide them with a large amount of flexibility and choice in composing their own curriculum. The students are provided with personal guidance throughout their curriculum, assisting them to compose a feasible and coherent programme. The teaching methods are very interactive and focus heavily on developing personal and academic skills, fitting the programme's goals. The panel sees room for additional improvement by considering more interaction between students and the research department during the final master's project phase. It is satisfied with the extra investments the programme has made in career orientation and suggests that the programme might add to this with extra electives on science communication and science and technology studies.

The programme is offered by an interdisciplinary teaching staff from various faculties brought together in the Descartes Centre and organized by a highly motivated core staff. The teachers are qualified and create a stimulating, open environment for students. The programme invests in the professionalization of the teaching staff, which is particularly visible in the high percentage of STQ-

certified staff members. The feasibility of the programme is adequate, although students often take longer to finish their programme due to their wide interests. The programme has invested in streamlining the master's thesis timeline, which the panel expects to lead to less delay in this part of the programme. The panel fully supports the use of English in this master's programme and thinks that this is the obvious choice in light of the programme's goals.

Conclusion

Master's programme History and Philosophy of Science: the panel assesses Standard 2 as 'meets the standard'.

Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Findings

Assessment system

The programme uses an assessment plan which details how the ILOs are assessed within the courses. Each course has an assessment matrix which relates the course goals to the tests within the course. The assessment form varies depending on the specific course goals and is mostly focused on essays, papers and presentations due to the major emphasis the programme puts on academic skills. To add to the students' learning process, the programme aims to provide them with extensive, personalized feedback on their work throughout the courses. Checking on fraud and plagiarism is the responsibility of the individual supervisor; the Board of Examiners has tested several software packages for automated plagiarism detection, but did not find one that met their standards.

The panel studied the programme's assessment plan, an overview of the assessment methods and criteria per course, and some examples of assignments used within the programme. It concludes that all ILOs are appropriately assessed throughout the programme. The assessment methods focus mostly on writing and to a lesser extent on presenting and debating, which fits the programme's goal to focus on skills rather than a fixed body of knowledge. The students indicated that they are very satisfied with the feedback they receive on their assignments and that it helps them improve. The panel strongly recommends the use of software for automated plagiarism detection. The large number of written assignments in the programme makes them susceptible to plagiarism. The panel reckons the use of imperfect software to be better than no check at all.

Assessment of master's projects

To assess the final master's projects, the programme uses an assessment form that provides students with a detailed assessment of their project in terms of process, presentation, report and results, including feedback to improve their skills. The forms include rubrics that assist the examiners to determine their grade. Each project is assessed by two examiners: the supervisor as first examiner and a second reader as second examiner. At least one of the examiners is required to be a member of the Descartes Centre. Both examiners grade the various aspects of the project separately, and the final grade per aspect is the average of the two grades. They fill out the comments on the assessment form together. The grades used on the form are the averages of the grades given by both examiners.

The panel is positive about the assessment of master's projects and the assessment forms. The students it interviewed were satisfied with the insightful grading and the extensive oral and written feedback they receive. The rubrics and the role of the second examiner add to the validity of the grading. The panel studied a number of assessment forms that were used in grading the master's projects prior to the site visit. It established that the forms are well-designed and filled out meticulously by the examiners. It thinks the programme has the opportunity to improve the transparency of the grading by making the role of the second examiner more visible. For instance,



the separate grades by the two examiners could be specified on the form rather than just their average, and their contribution to the final grade described.

Assessment of the internship

Students who opt for an internship ask their supervisor at the university for approval by filling out a Research Application Form, similar to the forms used for the final research project. It states the goals of the internship, which can be research-oriented when it is performed in a research environment, or oriented towards a career when done in a professional environment. The internship report is graded by the student's formal supervisor at the university, who consults the daily supervisor at the internship organization. The grading is performed with regard to the criteria noted down on the application form, using the same assessment form as the thesis project. The programme is planning to develop both the application and assessment forms towards ones more suited to the specific goals of the internship. The panel approves the use of the same procedures for grading the internship and for grading the thesis. It recommends ensuring that professional internships are not focused on work experience only but always have a clearly defined project goal for the student to achieve related to the programme's ILOs.

Board of Examiners

The GSNS has a faculty-wide Board of Examiners (EC-GSNS) that covers all master's degree programmes within the faculty. The EC-GSNS discusses the assessment policy and procedures for all programmes in general. Programme-specific tasks are delegated to the Executive Panels, which are assigned per domain. This includes course exemptions and approval of individual curricula within the programme and quality control of assessments. Students are in principle only in contact with the Executive Panel HPS and not with the EC-GSNS. THE EC-GSNS consists of the chairs of all Executive Panels and a dedicated chair. The Committee discusses exemptions to rules, student appeals against Executive Panel decisions, fraud and issues concerning individual examiners. The university uses general, broad Boards of Examiners with domain-specific Executive Panels. This combines a highly qualified overarching central committee with an approachable local panel containing programme-specific knowledge.

The quality of assessment is monitored by the Executive Panel HPS. This Executive Panel takes annual samples of course papers and theses (theses or papers in alternating years). It checks whether the assessment of the papers fits the course goals and is of sufficient quality. For the theses, it studies the report and the assessment form to check whether this has taken place according to the regulations. In recent years it found all assessments to be of adequate quality. It did find that the use of assessment forms could be more uniform, and shared its recommendations with the teaching staff.

The panel interviewed the Board of Examiners and studied a number of the Board's annual reports. In its opinion, the system with a central Board and domain-specific Executive Panels functions adequately, and the Board properly fulfils its role in the quality assurance of assessment within the programme. The panel thinks that the structure fits the university's educational philosophy, in which students often follow courses in other programmes. A more centralised system of assessment and a central Board of Examiners allows for more coherence in assessment between the individual programmes.

Considerations

The master's programme HPS has an adequate assessment system that assesses the students on all ILOs. A quality assurance system with frequent sampling to determine the quality of assignments and the final project enhances the validity and transparency of student assessment. The assessment methods focus on academic skills such as writing and presenting, with which teachers give students extensive feedback. The master's project is always assessed by two examiners, and the internship is always graded by an internal examiner. The associated assessment form could be improved by making the role of the second examiner more visible, for instance by including the grades of the two examiners separately. For the internship, the panel recommends ensuring that professional

internships always have a clearly defined project goal. It recommends including software for automated plagiarism detection for the written assignments in the programme, and especially for the final research project.

The Board of Examiners adequately fulfils its role in the quality assurance of assessment. The panel thinks that this fits the university's educational philosophy, in which students often follow courses in other programmes. A more centralised system of assessment and a central Board of Examiners allows for more coherence in assessment between the individual programmes.

Conclusion

Master's programme History and Philosophy of Science: the panel assesses Standard 3 as 'meets the standard'.

Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Master's projects

Prior to the site visit, the panel studied 15 master's theses of the HPS programme. It established that all graduates have achieved the programme's ILOs on a master's level. It encountered a wide range of topics in which students reflected on the role, function and history of science, reflecting the broad, interdisciplinary nature of the programme. The theses showed the intellectual capacity of the students and gave proof of adequate research skills and particularly writing skills, fitting the research and skills orientation of the programme's goal. The panel agreed with the grades awarded to the students by the programme. In an overview presented to the panel, the programme stated that four students have won national thesis prizes for their work in the past three years. The panel congratulates the programme on the level of its students.

Performance of graduates

An average of 40% of the programme's graduates continues their career in research as a PhD student. Others continue their career in science communication (18%), the private sector (16%), policy (8%) or other (20%). In general, they have no problem finding a job, which is confirmed by the alumni the panel interviewed. They are satisfied with the content and level of their education, and in particular value the opportunity for personal development the programme provided them with. The panel is positive about the performance of the graduates and considers the jobs they find mostly in line with the goals of the programme for graduates to be able to contribute to the societal debate on the role and functions of science in society. It is particularly impressed by the high number of students continuing in PhD research, which it considers very high for a programme in history and philosophy. It thinks that this reflects the high quality of the programme and the success regarding the programme's goals.

Considerations

The panel concludes that the final projects of the master's programme HPS are of a good quality, and convincingly show that the intended learning outcomes of the programme are achieved by the students. This is further demonstrated by the high number of students who start a PhD and the good job perspectives of all students.

Conclusion

Master's programme History and Philosophy of Science: the panel assesses Standard 4 as 'meets the standard'.



GENERAL CONCLUSION

The panel judged that the master's programme History and Philosophy of Science offered by Utrecht University meets all the standards of the NVAO assessment framework for limited programme assessment. The panel therefore advises positive about the accreditation of the programme.

Conclusion

The panel assesses the *master's programme History and Philosophy of Science* as 'positive'.

APPENDICES



APPENDIX 1: DOMAIN-SPECIFIC FRAMEWORK OF REFERENCE

There is no national domain specific frame of reference for the aims and learning outcomes of HPS. The Utrecht HPS programme is the only one in the Netherlands, and its setup is tailored to our objectives and strengths.

As it turns out, most foreign History & Philosophy of Science units do not yet have a clearly articulated specific frame of reference for their domain either. We have solicited information from master programmes at other universities that are more or less similar to our Utrecht programme, and we have received eight useful responses. These programmes are:

- The Philosophy of Science, Technology and Society master of the University of Twente
- The Philosophy of a Specific Scientific Discipline master of the University of Groningen
- The Philosophy master of Radboud University
- The HPS master of Oklahoma University, USA
- The History and Philosophy of Science and Medicine master of the University of Cambridge
- The HPS master of the Ruhr University Bochum
- The HPS master of the University of Vienna

These programmes' aims and learning outcomes, as mentioned in their course manuals, selfassessment and evaluation reports, are given below. Although they are obviously diverse in terms of content, it is equally clear that the programmes show strong family resemblances. They all aim to teach students to critically reflect on the nature, the production, and the uses of academic knowledge, be it from a historical, philosophical or socio-cultural perspective, and to enable students to contribute to their respective fields as researchers, within or outside academia.

More particularly, all programmes emphasize the importance of a body of cognitive knowledge and practical skills that students need to acquire to be able to participate in the production, dissemination and application of scientific knowledge in our field. Taken together, a suitable domain specific frame of reference can be derived from these family resemblances:

The HPS master programme is designed to accomplish that students, upon completion of the programme, have

- acquired a general overview of the major research areas, theories, concepts, research methods, as well as the major problems and debates, of the HPS field as a whole;
- demonstrated to be able to compare and assess the applicability and relevance of various ways of knowing;
- made an in-depth study of a more narrowly defined subfield or interdisciplinary area within the HPS field;
- shown the ability to analyse and discuss important topics of debate in their chosen fields;
- shown the ability to critically assess the role and significance of their field in society;
- have, as a result of the above, attained a level of scholarship that enables them to conduct research in their subfield or research area, or to apply their knowledge and skills as professionals in other fields in which their expertise is required or relevant;
- shown the ability to report in a clear and well-argued way - in accordance with accepted academic standards - on research findings, both in oral and written form.

Information from other programmes

Universiteit Twente

Master of Science Programme Philosophy of Science, Technology and Society

The aim of the programme is to equip students with knowledge and skills in the area of philosophy of technology, which is a domain that comprises not only the methodology and foundations of engineering, but also the various ways in which technology and society have become intertwined and depend on each other. The field of Science, Technology and Innovation studies (STS) is considered



as part of this domain. STS provides evidence-based insights into contemporary technology for philosophical reflection and is taught as a new way to do philosophy with empirical means, i.e. as a form of 'empirical philosophy'. The aim of the programme is achieved in such a way that graduates (making use of knowledge gained through a previous Bachelor's programme in engineering sciences, (applied) natural sciences, social sciences, or philosophy) are able to conduct philosophical or philosophically informed multidisciplinary analyses pertaining to the areas of technology, technical sciences and applied physical sciences, technological developments, and the relationship between technology and society. Graduates possess sufficient knowledge and skills to participate in professional practice, for example as scientific researchers, R&D researchers, consultants, policymakers, educators, or designers. They are able to independently carry out philosophical and/or STS research and could be considered for a PhD. position.

The PSTS programme's final qualifications.

The PSTS programme has as its domain the philosophy of technology, which is a field that is concerned with the philosophical study of technology and its implications for and interactions with society. In the PSTS programme, the philosophy of technology is understood broadly as a field that includes, next to philosophical approaches, empirical and multidisciplinary approaches from the field of science, technology and innovation studies (STS).

Knowledge

- K1. Extensive knowledge of the philosophy of technology, including its philosophical and STS approaches, and the ability to relate these approaches to each other.
- K2. Good knowledge of the various philosophical subfields, including ethics of technology, social and political philosophy of technology, philosophical anthropology of technology, epistemology and metaphysics of technology, and philosophy and history of (engineering) science and technology.
- K3. Good knowledge of approaches and themes in STS.
- K4. Good knowledge of empirical research methods in STS and philosophical research methods.
- K5. A basic understanding of the relation between the philosophy of technology, including its various subfields, methods and history, to general philosophy, including its various subfields, methods and history.
- K6. Specialist knowledge of a sub-domain or specialized topic within the philosophy of technology (broadly defined).

Skills

- S1. Writing and verbal communication skills.
- S2. Skills in reasoning and arguing and in the analysis of arguments.
- S3. Skills in locating, reading and analysing scientific texts from various disciplines in philosophy and STS, as well as professional and popular texts, that reflect on technology, engineering sciences, technological developments, and the relationship between technology and society.
- S4. Skills in the identification and analysis of problems related to the role of technology and science in society, and the ability to formulate a position with regard to these problems from a philosophical and/or STS perspective.
- S5. The ability to perform original scientific research in the field of philosophy of technology, using philosophical and/or STS methods. This includes the ability to arrive at a well-considered problem formulation, the selection and development of appropriate theories and (empirical) methodologies, and the proper execution of a research plan.
- S6. Skills in the comparison of differing scientific approaches or paradigms in a sub-domain
- S7. The ability to generate philosophical and/or STS research results that are relevant for scientific, technological, and/or social practices.
- S8. The capacity to communicate research results and solutions to colleagues, as well as professionals from other subject areas, and the ability to generate learning processes from that interaction.
- S9. Reflective capacity pertaining to one's own work, selecting or altering course, and the ability to translate learning trajectories into the development of more general knowledge and methods.

S10. Capable to endeavour a career inside or outside of academia wherein philosophical and STS knowledge and skills are required.

University of Groningen

Master's degree programme in Philosophy: Philosophy of a Specific Scientific Discipline

The aim of the degree programme is to:

- a. impart extensive knowledge and understanding of, and skills in, the philosophy of a specific scientific discipline, building on the Bachelor's degree in the Philosophy of a Specific Scientific Discipline
- b. enable students to independently apply the methodologies learned in logical analysis, empirical philosophy or the history of ideas
- c. provide further academic training
- d. teach independent academic thinking and conduct
- e. teach students to analyse complex problems
- f. teach the writing of academic/scientific reports
- g. teach students to apply their knowledge of the discipline, and to apply skills from a broader philosophical context
- h. to prepare for:
 - a profession relating to another degree programme, in which knowledge of the philosophy of a scientific discipline has added value
 - any profession in which knowledge and understanding of, and skills in philosophy have an added value
 - any profession in which general academic skills and training are required, with a particular focus on skills in logical analysis, the history of ideas, exegesis and empirical philosophy, and on expression skills in general
 - an academic career and further study.

The learning outcomes of the programme are:

1. With regard to knowledge and understanding:

On completion of the degree programme, students must have

- a. knowledge and understanding of the scientific discipline, building on and exceeding the level of the Bachelor's degree programme
- b. knowledge and understanding of the central elements of philosophy, in particular the core concepts, theories, problems and methodologies of the philosophy of a scientific discipline, building on and exceeding the level of the Bachelor's degree programme
- c. knowledge and understanding of the academic and social significance of philosophy in general, and of the philosophy of specific scientific disciplines in particular.

2. With regard to skills:

- a. the ability to place and evaluate research in a broader philosophical context than that of the scientific discipline
- b. the ability to creatively apply philosophy skills in logical analysis, the history of ideas and exegesis or empirical philosophy to problems, theories and debates relating to the scientific discipline
- c. the ability to independently formulate and carry out a philosophical/scientific research project relating to a scientific discipline (or cluster of disciplines).

Radboud Universiteit Nijmegen

Master Filosofie - Wijsbegeerte van een bepaald wetenschapsgebied

De masteropleiding leidt op tot een specialist op het terrein van de Wijsbegeerte van een Bepaald Wetenschapsgebied en biedt een academische vorming die op nauw contact met lopend onderzoek steunt. Na afronding van deze master is de student in staat:

- zijn/haar specialisme in verband te brengen met de filosofie als geheel, met het betreffende wetenschapsgebied en met de hedendaagse cultuur (in de brede zin van het woord).



- zelfstandig een wijsgerig probleem binnen het betreffende wetenschapsgebied te onderzoeken en de resultaten van dat onderzoek mondeling en schriftelijk te presenteren.

De afgestudeerde masterstudent beschikt over:

- kennis van de centrale disciplines van de wijsbegeerte en van de geschiedenis van de wijsbegeerte en hun relatie tot niet-wijsgerig vakwetenschappen
- grondige kennis van minstens twee wijsgerige vakgebieden of van een bijzonder domein van de geschiedenis van de wijsbegeerte.
- gespecialiseerde kennis van de wijsbegeerte van een bepaald wetenschapsgebied
- de vaardigheid om volgens de gangbare academische normen zorgvuldig en analytisch om te gaan met zowel wijsgerige als niet-wijsgerige teksten en problemen.
- de vaardigheid de verschillende stappen in een wijsgerig onderzoek te verrichten en de resultaten van dit onderzoek mondeling en schriftelijk te presenteren.

University of Oklahoma, Oklahoma, USA

Master History of Science, Technology and Medicine

Students are expected to acquire a comprehensive understanding of the history of science from antiquity to the modern period, and in a variety of disciplines and traditions, while also achieving a focal training that permits them to assume positions in history, history of science, and related professional fields.

Intended Outcomes and Objectives:

The Master of Arts in History of Science at the University of Oklahoma is designed to provide students with a comprehensive understanding of the field while introducing students to the literature and methods of the discipline. Students achieve these objectives through both coursework and individual research projects; for students who complete the degree with the thesis option, the MA thesis is the principal means of demonstrating competency in the program.

1. While enrolled in the MA program, students shall take graduate courses that survey ancient and medieval, Renaissance and early modern, and modern science and that introduce them to the core methods and historiography of the discipline.
2. Students shall develop critical and analytical skills involved in historical research by completing MA theses and/or PhD dissertations in a timely fashion. In cases where students are enrolled in the terminal, non-thesis MA program, students shall demonstrate critical and analytical skills through course research papers and the completion of a comprehensive examination at the end of the program.
3. Following completion of the program, students shall be prepared to assume professional positions that use skills and information acquired in the program.

University of Cambridge

Master of Philosophy in History and Philosophy of Science and Medicine

The M.Phil is offered by the Department of History and Philosophy of Science as a full-time period of research and introduces students to research skills and specialist knowledge. Its main aims are:

- to give students with relevant training at first-degree level the opportunity to carry out focussed research in History and Philosophy of Science and Medicine under close supervision;
- to give students the opportunity to acquire or develop skills and expertise relevant to their research interests;
- to enable students to acquire a critical and well informed understanding of the roles of the sciences in society; and
- to help students intending to go on to doctoral work to acquire the requisite research skills and to prepare a well-planned and focussed PhD proposal.

By:

- giving students the experience and guidance necessary for them to be able to formulate a realistic research proposal, and to prepare written work based on such a proposal to a strict timetable;
- introducing students to relevant research resources, including the department's Research Methods handbook which is available on the HPS website;
- giving students the experience of presenting their own work and discussing the issues that arise from it with an audience of their peers and senior members of the department;
- providing lectures, supervisions and research seminars in a range of technical/specialist subjects central to research in the different areas of History and Philosophy of Science and Medicine, and giving students the opportunity to base some of their essays or dissertation on such teaching.

Knowledge and Understanding:

By the end of the course, students will have:

- developed a deeper knowledge of their chosen areas of History and Philosophy of Science and Medicine, and of the critical debates within them;
- acquired a conceptual understanding that enables the evaluation of current research and methodologies;
- formed a critical view of the roles of the sciences in society.

Skills and other attributes:

By the end of the course students should have:

- acquired or consolidated historiographic, linguistic, technical and ancillary skills appropriate for research in their chosen area;
- demonstrated independent judgement, based on their own research;
- presented their own ideas in a public forum and learned to contribute constructively within an international environment.

Ruhr Universität Bochum

Master Philosophy and Culture of Science (HPS+)

1. Profil und Ziel

Im Zentrum des Masterstudiengangs Philosophie, Geschichte & Kultur der Wissenschaften / History, Philosophy & Culture of Science (im Folgenden: HPS+) steht die interdisziplinäre Ausbildung in Wissenschaftstheorie und Wissenschaftsgeschichte. Diese wird durch ergänzende Studien in weiteren geistes-, kultur-, und sozialwissenschaftlichen Disziplinen bereichert, die sich der Analyse und Reflexion von Wissenschaften in Kultur und Gesellschaft widmen. Speziell umfassen diese die Literatur-, Medien und Sozialwissenschaften sowie (in kleineren Anteilen) die Rechtsgeschichte und Medizingeschichte [...] *Interdisziplinarität, Forschungsnähe* und *problemorientierte Ausrichtung* sind die drei Zieldimensionen, mit denen sich das Profil des Studiengangs treffend beschreiben lässt [...]

Der Masterstudiengang zielt auf eine problemorientierte Reflexion der vielfältigen Dimensionen moderner Wissensgesellschaften [...] Die gemeinsame Ausrichtung auf den ‚Gegenstand‘ Wissenschaft und die verschiedenen Erkenntnisinteressen, Perspektiven und Methoden hinsichtlich dieses ‚Gegenstandes‘ bestimmen das inhaltliche Profil des Studiengangs [...]

Durch das Studium sollen die Absolventen und Absolventinnen in die Lage versetzt werden, die Herausforderungen gegenwärtiger Wissensgesellschaften in ihrer Komplexität zu verstehen und normativ zu reflektieren, d.h. sie werden in die Lage versetzt, wissenschaftliches Wissen in seinen

kulturell-historischen Genesebedingungen zu erkennen, die Geltungsansprüche von Wissenschaften zu beurteilen und gesellschaftliche Folgen von Wissenschaften einschätzen zu können.

Durch die Ausrichtung des Studiengangs werden die Studierenden in verschiedener Hinsicht zur interdisziplinären Forschung befähigt: Zum einen lernen sie spezifische Sichtweisen der beteiligten geistes und sozialwissenschaftlichen Teildisziplinen kennen, werden sich der Möglichkeiten und



Grenzen der jeweiligen Teildisziplinen bewusst und können die unterschiedlichen disziplinären Perspektiven gewinnbringend miteinander in Beziehung setzen. Zum anderen befördert der Studiengang auf Grund seines Gegenstandsbereichs ein grundlegend interdisziplinäres Verständnis zwischen den Geistes- und Naturwissenschaften.

2. Die Struktur und der Inhalt des Lehrangebots werden von den folgenden übergeordneten Zielen zur *Kompetenzentwicklung* geleitet:

- Erwerb der Fähigkeit zur normativen Argumentation für und Beurteilung von Geltungsansprüchen von Wissenschaft und ihrer Methoden. Hierbei geht es vor allem darum, die epistemischen und methodischen Besonderheiten wissenschaftlichen Wissens gegenüber anderen Wissensbeständen erkennen und beurteilen zu lernen. Die Studierenden werden darin ausgebildet, Rationalitäts- und Methodenkriterien der Wissenschaft zu erkennen und zu unterscheiden. V. a. das Vermögen, epistemische und nichtepistemische Wertentscheidungen der Wissenschaft differenzieren und begründet beurteilen zu können, ist wesentlich für ein Verständnis von Wissenschaft überhaupt.
- Erlangung der Kompetenz, wissenschaftliches Wissen als historisch gewachsenes in seinen spezifischen Genese- und Entwicklungsbedingungen zu erkennen und sich im ‚wissenschaftshistorischen Erfahrungsraum‘ der Neuzeit sicher bewegen zu können. Hier geht es darum, historische Entwicklungen der Wissenschaften (wie Wandel- und Konsolidierungsphasen, die Ausdifferenzierung von Wissenschaften) identifizieren zu lernen, aber auch um die Erlangung des Vermögens, spezifische Entwicklungen einzelner Disziplinen bzw. Wissenschaftlicher Forschungsfelder im historischen Wechselspiel mit Kultur, Politik und Gesellschaft verstehen zu können. Unabdingbar ist dabei auch der Erwerb eines entsprechenden historiographischen und eines wissenschaftshistorischen Methodenarsenals (Quellenerschließung, -analyse, etc.).
- Gewinnung des Vermögens, Wissenschaft als menschliche Kulturleistung aus der Perspektive anderer Kulturleistungen (wie Literatur, Kunst und Medien) beurteilen und zu diesen in Beziehung setzen zu können. Hierzu zählen der Erwerb der Einsicht, dass und wie sich Wissenschaft verschiedenster symbolischer und medialer Vermittlungsformen bedient, die vom Standpunkt anderer symbolischer Formen hinterfragbar sind und Kommunikationsprobleme wie auch fruchtbare Austauschprozesse generieren. Auch die erfolgreiche Vermittlung von Wissenschaft hat darauf Rücksicht zu nehmen.
- Erlangung der Fähigkeit, potentielle gesellschaftliche Folgen wissenschaftlicher Erkenntnis einzuschätzen und ethisch verantwortbare Handlungsorientierungen für die Anwendung wissenschaftlichen Wissens begründet zu entwickeln. Wissenschafts- und Umweltethik sowie Wissenschafts- und Technikforschung sind die wichtigsten Problemfelder, an denen diese Fähigkeit ausgebildet wird.
- Erzielung der Fähigkeit zum interdisziplinären Dialog und zur interdisziplinären Forschung. Interdisziplinarität setzt zunächst starke Disziplinarität voraus, d. h. die sehr gute Beherrschung von Kenntnissen und Methoden eines der o. g. Fachgebiete (s.o., Zugangsvoraussetzungen).

Universität Wien

Masterstudium History and Philosophy of Science (HPS)

(1) Das Ziel des Masterstudiums HPS an der Universität Wien ist der Erwerb von Kenntnissen und Kompetenzen im Hinblick auf historische, kulturwissenschaftliche und philosophische Untersuchungen des im weiten Sinne verstandenen wissenschaftlichen Forschens. Die Ausbildung umfasst inhaltlich breite und methodologisch präzise Kompetenzen zur Rekonstruktion, zur Analyse und zur Evaluierung von:

1. historischen Entwicklungen des wissenschaftlichen Feldes (Konzepte, Wissensfelder, Institutionen, Biographien) in politik-, sozial-, kultur- und geschlechterhistorischen Kontexten;
2. wissenschaftsphilosophischen Modellen und Fragestellungen;
3. gesellschaftlichen Ursachen, Zusammenhängen und Folgen des wissenschaftlichen Forschens.

(2) Die Absolventinnen und Absolventen des Masterstudiums HPS an der Universität Wien sind über ein Bachelorstudium hinaus befähigt zur eigenständigen Formulierung wissenschaftlicher Fragestellungen, zum Verständnis unterschiedlicher fachübergreifender Fragestellungen, zur

Entwicklung allgemeiner Problemlösungsstrategien und zu kritischem wissenschaftlichem Denken und Arbeiten, sowie zur Wahrnehmung sozialer, kultureller und geschlechterbezogener Perspektiven. Insbesondere können sie in historischen Kategorien und Entwicklungszusammenhängen denken und diese forschungsorientiert anwenden, philosophische Argumente analysieren, philosophische Problemlösungen kritisch prüfen und argumentativ rechtfertigen; sie erhalten eine vertiefte Kenntnis der allgemeinen Wissenschaftsgeschichte samt ihrer Methoden, Grundlagen und Historiographie, vertiefte Kenntnisse von ausgewählten Themen und Problemen der Wissenschaftsgeschichte, vertiefte historische und theoretische Kenntnisse der Wissenschaftsphilosophie, vertiefte Kenntnis zentraler Konzepte der Theorienarchitektur und Theoriendynamik sowie ausgewählter wissenschaftsphilosophischer Themen; sie verfügen über soziale und kommunikative Kompetenzen, insbesondere zur projektorientierten Teamarbeit, zur Präsentation der Forschungsergebnisse in der Öffentlichkeit und zur Teilnahme an internationalen wissenschaftlichen Diskussionsprozessen (Verteidigung von Thesen, Streitgesprächführung, Formulierung konstruktiver Diskussionsbeiträge), sowie über die Fähigkeit zum stark transdisziplinär orientierten Lehren und Forschen und zur interdisziplinären Vermittlung.

Das Studium stellt eine vertiefte wissenschaftliche Berufsvorbildung dar, ist forschungsorientiert und stellt Qualifikationen für eine akademische Laufbahn in einer sich international stark entwickelnden Forschungslandschaft bereit. Insbesondere qualifiziert dieses Masterstudium für ein Doktoratsstudium in den Bereichen Wissenschaftsgeschichte, Wissenschaftsmethodologie und Wissenschaftstheorie. Ferner qualifiziert es für wissenschaftshistorische und wissenschaftstheoretische Aufgaben im Bereich von Museen, Archiven wissenschaftlicher Institutionen, sowie für Wissenschaftsjournalismus, Wissenschaftsmanagement und anderen einschlägigen Institutionen und Berufen.



APPENDIX 2: INTENDED LEARNING OUTCOMES

The HPS master programme is designed to accomplish that students, upon completion of the programme, have

- acquired a general overview of the major research areas, theories, concepts, research methods, as well as the major problems and debates, of the HPS field as a whole;
- demonstrated to be able to compare and assess the applicability and relevance of various ways of knowing;
- made an in-depth study of a more narrowly defined subfield or interdisciplinary area within the HPS field;
- shown the ability to analyse and discuss important topics of debate in their chosen fields;
- shown the ability to critically assess the role and significance of their field in society;
- have, as a result of the above, attained a level of scholarship that enables them to conduct research in their subfield or research area, or to apply their knowledge and skills as professionals in other fields in which their expertise is required or relevant;
- shown the ability to report in a clear and well-argued way - in accordance with accepted academic standards - on research findings, both in oral and written form.

APPENDIX 3: OVERVIEW OF THE CURRICULUM

Study programme History and Philosophy of Science				
	Period 1	Period 2	Period 3	Period 4
Year 1	History of the Natural Sciences (mandatory, 7.5 EC)	History of the Humanities (mandatory, 7.5 EC)	Elective courses (15 EC)	Elective courses (15 EC)
	Philosophy of Science (mandatory, 7.5 EC)	Elective courses (7.5 EC)		
	GSNS introduction (mandatory, 0.5 EC)	Dilemmas of the Scientist (mandatory, 0.5 EC)		
Year 2	Research project (52.5 EC) or:			
	Research project (37.5 EC) + Internship (15 EC)			
	Research seminar (6.5 EC)			

APPENDIX 4: PROGRAMME OF THE SITE VISIT

Dinsdag 4 juni

09.00 – 11.00	Welkom en voorbereiding
11.00 – 11.45	Inhoudelijk verantwoordelijken Natuurkunde
11.45 – 12.15	Inloopspreekuur
12.15 – 12.45	Lunch
12.45 – 13.45	Studenten bachelor/master Natuurkunde
13.45 – 14.15	Rondleiding
14.15 – 14.30	Pauze / uitloop
14.30 – 15.30	Docenten Bachelor/Master Natuurkunde
15.30 – 15.45	Pauze
15.45 – 16.30	Examencommissie
16.30 – 16.45	Pauze
16.45 – 17.15	Alumni Master Natuurkunde
17.15 – 18.00	Intern overleg

Woensdag 5 juni

09.00 – 10.00	Aankomst en voorbereiding
10.00 – 10.45	Inhoudelijk verantwoordelijken HPS
10.45 – 11.00	Pauze
11.00 – 11.45	Studenten en alumni HPS
11.45 – 12.00	Pauze
12.00 – 12.45	Docenten HPS
12.45 – 13.30	Lunch / intern overleg
13.30 – 14.15	Eindgesprek management
14.15 – 16.00	Opstellen oordelen
16.00 – 16.15	Mondelinge rapportage
16.15 – 16.30	Pauze
16.30 – 17.15	Ontwikkelgesprek
17.15 – 17.30	Afronding

APPENDIX 5: THESES AND DOCUMENTS STUDIED BY THE PANEL

Prior to the site visit, the panel studied 15 theses of the master's programme History and Philosophy of Science. Information on the selected theses is available from QANU upon request.

During the site visit, the panel studied, among other things, the following documents (partly as hard copies, partly via the institute's electronic learning environment):

- Education and Examination Regulations
- Overview of the curriculum
- Examples of recent special topics, tutorials and internships
- Teaching staff
- Thesis and paper assessment guidelines
- Summary of NSE results 2018
- Study Guide
- Course manuals of selected courses
- Minutes of the Onderwijsadviescommissie (OAC), Opleidingscommissie (OC), and Examencommissie (EC)
- Assessment plan