Medical and Pharmaceutical Drug Innovation

Faculty of Medical Sciences,
University of Groningen

Quality Assurance Netherlands Universities (QANU)
Catharijnesingel 56
PO Box 8035
3503 RA Utrecht
The Netherlands

Phone: +31 (0) 30 230 3100
Telefax: +31 (0) 30 230 3129
E-mail: info@qanu.nl
Internet: www.qanu.nl

Project number: Q0369

CONTENTS

Report on the master's programme Medical and Pharmaceutical Drug Innovation of University of Groningen 5

Administrative data regarding the programme 5
Administrative data regarding the institution 5
Quantitative data regarding the programme 5
Composition of the assessment committee 5
Working method of the assessment committee 6
Summary judgement 9
Description of the standards from the Assessment framework for limited programme assessments 13

Appendices 29

Appendix 1: Curricula Vitae of the members of the assessment committee 31
Appendix 2: Intended learning outcomes 33
Appendix 3: Overview of the curriculum 35
Appendix 4: Quantitative data regarding the programme 37
Appendix 5: Programme of the site visit 39
Appendix 6: Theses and documents studied by the committee 41
Appendix 7: Declarations of independence 43

This report was finalized on 10 December 2012.

Report on the master's programme Medical and Pharmaceutical Drug Innovation of University of Groningen

This report takes the NVAO's Assessment Framework for Limited Programme Assessments as a starting point.

Administrative data regarding the programme

Master's programme Medical and Pharmaceutical Drug Innovation

Name of the programme:	Medical and Pharmaceutical Drug Innovation
CROHO number:	60617
Level of the programme:	master's
Orientation of the programme:	academic
Number of credits:	120 EC
Specializations or tracks:	-
Location(s):	Groningen
Mode(s) of study:	full time
Expiration of accreditation:	31-12-2013

The visit of the assessment committee Pharmacy to the Faculty of Medical Sciences of University of Groningen took place on 8 and 9 October 2012.

Administrative data regarding the institution

Name of the institution:	University of Groningen
Status of the institution:	publicly funded institution
Result institutional quality assurance assessment:	applied (pending)

Quantitative data regarding the programme

The required quantitative data regarding the programme are included in Appendix 4.

Composition of the assessment committee

The committee that assessed the master's programme Medical and Pharmaceutical Drug Innovation consisted of:

- Prof. F.G.M. (Frans) Russel (chair), professor of Molecular Pharmacology and Toxicology, UMC St. Radboud;
- Prof. A. (Alfons) Verbruggen, professor of Radiopharmacy and Drug Analysis, Catholic University Leuven;
- Prof. H.J. (Henk-Jan) Guchelaar, professor of Clinical Pharmacy, University of Leiden;
- M.J.M. (Marga) van Weelden-Hulshof, independent pharmacist, Apotheek Ermel, Ermelo;
- J.M. (Jantine) Brussee, BSc, student of Bio-Pharmaceutical Sciences, University of Leiden.

The committee was supported by dr. A. Venemans-Jellema, who acted as secretary under the supervision of dr. M.J.V. Van Bogaert.

Appendix 1 contains the curricula vitae of the members of the committee.

Working method of the assessment committee

The assessment of the master's programme Medical and Pharmaceutical Drug Innovation of the University of Groningen was part of a Pharmacy cluster assessment in which Utrecht University and the University of Groningen were involved. The formal kick-off meeting of the assessment committee took place on 10 September 2012 in Utrecht. During this meeting, the committee was given its instructions, and its tasks and functioning were discussed.

Preparation
QANU received the critical reflection of the master's programme Medical and Pharmaceutical Drug Innovation of the University of Groningen on 6 July 2012. After having established that the reflection fulfilled the criteria of relevance and completeness, the project manager distributed it along with additional information to the members of the committee. They read the reports and prepared questions and comments prior to the site visit. The project manager collected these questions in a document and classified them according to panel conversation and subject. Some additional questions were sent to the institution for further clarification.

In addition, all committee members read recent theses from the master's programme. In consultation with the chair of the committee, five master's theses were selected, covering the range of marks given. The committee members received QANU's checklist for the assessment of theses to ensure that their assessments were comparable. Since the programme leads to a scientific degree (MSc), the committee paid specific attention to the scientific level of the theses, the requirements, the care taken with judgement by the reviewer of the programme, and the assessment procedure used. Prior to the site visit, the committee members discussed those theses whose positive assessment was questioned. They were ultimately checked by a second committee member.

Prior to the site visit, the committee requested insight into the structure, content, assessment and evaluation of two courses, *Top Class I: The cell* and *Top Class IV: Theoretical preparation for advanced research- project writing*. During the site visit, the committee assessed the quality of the course descriptions, student information, programmes and exams in more detail. An overview of all documents and theses reviewed by the committee is included as Appendix 6.

The project manager drafted a programme for the site visit. This was discussed with the chair of the committee and the coordinator of the programme. As requested by QANU, the coordinator of the programme carefully selected representative panels. The committee agreed with this panel selection. A schedule of the programme with all partners is included as Appendix 5. Before the site visit, both staff members and students were informed about the opportunity to speak to the committee confidentially during the 'consultation hour'. One request by a staff member was received.

Site visit
The site visit to the University of Groningen took place on 8-9 October 2012. It started with preparatory meetings on 7 and 8 October 2012, during which the committee members discussed their findings based on the critical reflections for the master's programme. The committee also discussed the theses, its own working methods, and the questions and issues

to be raised in the interviews with representatives of the programme and other stakeholders. Furthermore, it studied documents provided by the coordinator of the site visit. They included minutes of the Education Committee and the Board of Examiners, course descriptions, written exams, assignments and other assessments.

During the visit the committee interviewed the programme management, students, staff members, graduates, members of the Education Committee and the Board of Examiners, and student advisors. Finally, the committee members studied additional materials made available by the programme.

After the concluding meeting with the management on the second day of the site visit, the committee members extensively discussed their assessment of the programme and prepared a draft of the findings. The site visit concluded with a presentation of the preliminary findings by the chair of the committee. This consisted of a general assessment and several specific findings and impressions of the programme, as well as some recommendations.

Report
After the visit, the project manager produced a draft version of the report. She submitted the report to the chairman for comments, and then the report was circulated to the committee. The project manager processed corrections, remarks and suggestions for improvement provided by the committee members to produce the revised draft report. This was then sent to the University of Groningen to check for factual errors. The comments and suggestions provided by the University of Groningen were discussed with the chair of the committee and, where necessary, with the other committee members. Based on the committee's decisions to incorporate or ignore the comments and suggestions, the secretaries compiled the final version of the programme report.

Decision rules
In accordance with NVAO's Assessment Framework for Limited Programme Assessments (as of 6 December 2010), the committee used the following definitions for the assessment of both the standards and the programme as a whole.

Generic quality
The quality that can reasonably be expected in an international perspective from a higher education bachelor's or master's programme.

Unsatisfactory
The programme does not meet the current generic quality standards and shows serious shortcomings in several areas.

Satisfactory
The programme meets the current generic quality standards and shows an acceptable level across its entire spectrum.

Good
The programme systematically surpasses the current generic quality standards across its entire spectrum.

Excellent
The programme systematically well surpasses the current generic quality standards across its entire spectrum and is regarded as an (inter)national example.

Summary judgement

This report reflects the committee's findings and considerations on the master's programme Medical and Pharmaceutical Drug Innovation at the University of Groningen. The evaluations are based on interviews conducted with staff, students and graduates of the programme and on information provided in the critical reflection, selected theses, course files and additional details provided during the site visit. During its assessment, the committee observed positive aspects as well as issues that could be improved. Taking these aspects into consideration, the committee decided that this programme fulfils the requirements set by the NVAO for re-accreditation.

Standard 1: Intended learning outcomes
The goal of the master's programme Medical and Pharmaceutical Drug Innovation (MPDI) is to prepare talented students for a career in scientific research at the interface of the (bio)medical and pharmaceutical sciences with a focus on insight into and approach to scientific problems. The MPDI aims to educate students to continue in research as a PhD student. The programme is selective (aiming at the top five to ten percent of the student cohorts), is entirely taught in English and consists of two research internships.

The committee verified the objectives and intended learning outcomes of the programme, but there is no domain-specific frame of reference. Although MPDI is a unique programme, the committee believes it is possible to construct a frame of reference with comparable programmes (Dutch) in the biomedical and pharmaceutical field. It strongly recommends working on such a framework in the context of international benchmarking.

The committee concludes that the intended learning outcomes are clearly of an academic nature and level, and correspond to general, internationally accepted descriptions of a master's programme. Thus, they fulfil the descriptions of MPDI as a scientific, university-level and research-oriented master's programme. The committee concludes that the programme provides graduates with a solid foundation, qualifying them for an academic career.

Standard 2: Teaching-learning environment
The programme has a study load of 120 ECTS and takes two full time years. The first courses are designed to introduce students to the research topics of the GUIDE research institute and to the skills required to participate in the scientific community. The programme continues with active participation in research, and the students develop the necessary professional skills of a researcher through the appropriate assignments and the two research projects. At the end of the two-year programme, the students prepare their own proposal for a PhD project.

The committee studied the various aspects of the programme's teaching and learning environment: the curriculum, the staff and the facilities. It established that the curriculum is a good realization of the programme's intended learning outcomes. It is well-structured and well-balanced and prepares students perfectly for a career in scientific research. The committee appreciates the two research projects and fully agrees that MPDI is a research-driven programme. It is positive about the way scientific training is implemented in the programme.

The curriculum of the programme is based on a 'master-apprentice' relationship. The committee believes that this principle fits well with this master's programme. It has noticed that there is daily supervision by a postdoc or experienced PhD student, but that the actual

number of face-to-face moments between students and the principal investigators is rather limited.

The committee was impressed by the enthusiasm, involvement and quality of the teaching staff. The services provided for the students, including a mentor, and the accessibility of the staff for the students add to the general impression that this is a good programme. Because the number of students in the courses is kept low, there is always a lot of interaction between the teaching staff and the students. The committee is impressed by the student/teacher ratio of 7.7. Currently, 28% of the teaching staff has obtained their University Teaching Qualification (UTQ), and another 22% of the teaching staff is participating in the training for the UTQ. The committee states that an UTQ is a necessary condition for all teachers to train excellent students. Therefore, it advises all staff members to obtain their qualification as soon as possible.

The committee established that the study load is quite demanding, but feasible. It noted a relatively high drop-out rate of more than 25%. Nevertheless, it is convinced that the improved selection process at intake will lower this percentage. The maximal capacity of the programme (20 students) has not been reached yet. The committee advises the programme to keep focussing on public relations.

Standard 3: Assessment and achieved learning outcomes
The method of assessing a course is related to its nature. Courses in which knowledge is essential are assessed by written or oral examinations. Courses, which train skills, are assessed by assignments, presentations and reports.

The quality of the examinations the committee inspected was good. The committee established that the programme's overall assessment system is well-considered. The assessment methods are varied and enable the programme to establish whether students have acquired the intended learning outcomes. The assessments are valid, reliable and transparent.

The committee was rather impressed with the quality of the theses. It believes that the high grades of the master theses are justified and reflect the high quality of the programme in general. The number of graduates accepted as PhD students also illustrates the quality of the programme.

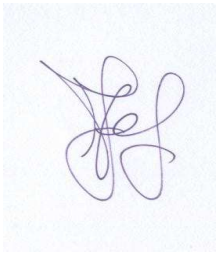
The committee considers the intentions of the Board of Examiners in monitoring the quality of examinations to be good, but feels that a considerable quality improvement should be implemented soon. It strongly recommends formalizing and documenting these processes, so that the review can be more easily checked. Additionally, the independence of the Board of Examiners is very important. The committee suggests that MPDI could sign up with a Board of Examiners of another programme

Conclusion
The committee assesses the standards from the Assessment Framework for Limited Programme Assessments in the following way:

Standard 1: Intended learning outcomes	satisfactory
Standard 2: Teaching-learning environment	good
Standard 3: Assessment and achieved learning outcomes	satisfactory
General conclusion	satisfactory

The chair and the secretary of the committee hereby declare that all members of the committee have studied this report and that they agree with the judgements laid down in it. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 10 December 2012



Prof. F.G.M. Russel

Dr. A. Venemans-Jellema

Description of the standards from the Assessment framework for limited programme assessments

Standard 1: Intended learning outcomes

The intended learning outcomes of the programme have been concretised with regard to content, level and orientation; they meet international requirements.

Explanation:
As for level and orientation (bachelor's or master's; professional or academic), the intended learning outcomes fit into the Dutch qualifications framework. In addition, they tie in with the international perspective of the requirements currently set by the professional field and the discipline with regard to the contents of the programme.

Findings

Domain-specific frame of reference
The goal of the master's programme Medical and Pharmaceutical Drug Innovation (MPDI) is to prepare talented students for a career in scientific research at the interface of the (bio)medical and pharmaceutical sciences with a focus on insight into and approaches to scientific problems.

The MPDI aims to educate students to continue in research as a PhD student. The critical reflection mentions that the entire programme is designed to meet this goal: it is selective (aiming at the top five to ten percent of the student cohorts), is taught entirely in English and consists of two research internships. Furthermore, the teachers in the programme are all principal investigators of the Groningen University Institute for Drug Exploration (GUIDE).

The critical reflection states that these objectives are implemented in a programme that actively stimulates interdisciplinary cooperation in advancing science from a biomedical and pharmaceutical perspective. In addition, the programme is student-oriented, offers a small-scale, academic learning environment (taking the highest scientific and ethical standards into account) with extensive interaction between researchers and the student population.

According to the critical reflection, the unique features of the MPDI master's programme are represented by its focus on (inter)nationally accepted learning outcomes, interdisciplinary research in the (bio)medical and pharmaceutical sciences, and intellectual skills (e.g. critical self-reflection, review processes, quality awareness, grant proposal writing, meeting deadlines). Academic scientists in the field of medical and pharmaceutical drug innovation focus on the elucidation of disease mechanisms with a keen eye on the potential development of novel diagnostic and therapeutic tools, including the identification of novel targets, novel therapeutic modalities based on these targets and the (targeted) delivery of these novel therapeutic modalities. These topics cover the complete range of cell biological studies (in vitro studies), whole organ and whole organism (in vivo) studies, translational studies, (bio)synthesis of novel therapeutic substances, and the development of delivery technology.

As described in the critical reflection, the programme distinguishes itself from other master's programmes by its strong focus on training in research skills. Specifically, students are intensively trained in presentation skills, critical reading and analysis of the scientific literature (opposing views, writing a review report), scientific discussion, 'helicopter view' (writing an editorial), meeting deadlines, attending a scientific symposium (prior to the official start of the programme), analyzing the quality of researchers and research groups (quality of output, H-

factor, impact factor, fund-raising potential, international networks) and writing and defending a research proposal in an Innovational Research Incentives Scheme VENI-like procedure (including an 'in-house' committee, written rebuttal to reviewers, presentation of proposal, discussion).

Based on interviews with the programme management, the committee believes that they have a good idea of the specific signature of the programme as described above. Unfortunately, there is no domain-specific frame of reference available. According to the committee, the framework described in the critical reflection is a summary of the objectives of the programme, and does not include a description of the domain of the (bio)medical and pharmaceutical drug innovation field for which the programme prepares its students. In advance of the site visit, the management of the programme was asked to explain the framework further. In a written statement, the programme management described their programme as distinct from other master programmes in the biomedical sciences with respect to the strong focus on research and quality. The committee agrees that these aspects are unique to this master's programme. However, there are some comparable master's programmes in the Netherlands, for instance Molecular Mechanisms of Disease (Nijmegen), Molecular Medicine (Rotterdam) or Drug Innovation (Utrecht). The committee affirms that local profiling need not hinder achieving a consensus on a common domain. In addition, with a more elaborate and common Netherlands reference framework, MPDI could orient itself more strongly to international benchmarking. The committee strongly recommends working with other, comparable master's programmes on a consensus on the requirements for a master's programme in the field of medical and pharmaceutical drug innovation.

Intended learning outcomes, level and orientation
The intended learning outcomes (see Appendix 2) reflect that the graduate has gained advanced academic skills and knowledge and is able to function as an original researcher in the biomedical and pharmaceutical field. The intended learning outcomes of the MPDI programme are based on the requirements for enrolling PhD students. Therefore, its requirements originate from those for PhD students and are based on discussions with colleagues (international and national).

The committee finds that there is a clear description of the objectives and intended learning outcomes. It concludes that the intended learning outcomes are explicitly of an academic nature and level. In addition, it interviewed alumni who chose to obtain a doctorate and established that they were excellently equipped in terms of research skills. It also verified the relationship between the intended learning outcomes and the Dublin descriptors, which are considered to be general, internationally accepted descriptions of a master's programme. The committee observed that all Dublin descriptors are reflected in the intended learning outcomes.

Considerations
The committee verified the objectives and intended learning outcomes of the programme, but noted that a domain-specific frame of reference was lacking. Although MPDI is a unique programme, the committee believes it is possible to construct a frame of reference with comparable Dutch programmes in the biomedical and pharmaceutical field. The committee strongly recommends working on such a framework in the context of international benchmarking.

The committee concludes that the intended learning outcomes are clearly of an academic nature and level, corresponding with general, internationally accepted descriptions of a

master's programme. Thus, they fulfil the description of MPDI as a scientific, university-level and research-oriented master's programme. The committee concludes that the programme provides graduates with a solid foundation qualifying them for an academic career.

Conclusion

Master's programme Medical and Pharmaceutical Drug Innovation: the committee assesses Standard 1 as **satisfactory**.

Standard 2: Teaching-learning environment

The curriculum, staff and programme-specific services and facilities enable the incoming students to achieve the intended learning outcomes.

Explanation:
The contents and structure of the curriculum enable the students admitted to achieve the intended learning outcomes. The quality of the staff and of the programme-specific services and facilities is essential to that end. Curriculum, staff, services and facilities constitute a coherent teaching-learning environment for the students.

Findings

In this standard the following subjects will be addressed: didactic principles (2.1), structure and cohesion of the programme (2.2), assimilation of the intended learning outcomes in the programmes (2.3), scientific training (2.4), academic staff and student-teacher ratio (2.5), feasibility and tutoring system (2.6) and quality management and programme-specific facilities (2.7).

2.1. Didactic principles

The curriculum of the programme is based on a 'master-apprentice' relationship. The master is a teacher who is also an active researcher (principal investigator) and acts as a 'mentor' of the apprentice and the apprentice is a student being taught from the beginning to become an independent researcher. The master-apprentice relationship includes:

1) Integration of education and research,
2) Emphasis on learning the intellectual skills necessary to perform innovative, interdisciplinary research, rather than learning only textbook knowledge and practical skills, and
3) Small-scale, highly interactive education by teaching staff recruited from among the best researchers within GUIDE (principal investigators).

According to the critical reflection, the integration of education and research is the result of the notion that students are best educated to become researchers by doing supervised research. Therefore, the cornerstones of this programme are two research projects of 30 ECTS each, to be undertaken at two different research groups within the GUIDE research institute. Students are encouraged to go abroad during the second research project under the supervision of a GUIDE staff member. This allows students to participate in the practice of scientific research on a daily basis. The student has to work in an interdisciplinary team and will be trained to perform scientific research. During these research projects students participate completely in a research environment, including attending the research meetings where they present and discuss their findings and participate in scientific discussions of other projects. The students conclude their research projects with an oral presentation to an audience with ample expertise in the subject of study, followed by a discussion.

The committee appreciates the didactic principle of the programme and believes that it fits well with this master's programme. However, the committee has observed that in daily practice the actual number of face-to-face moments between students and the principal investigators is rather limited and needs to be improved.

2.2. Structure and cohesion of the programme

The programme has a study load of 120 ECTS and takes two years (see Appendix 3 for an overview of the curriculum). To prepare the students to participate in research, the programme starts with three compulsory courses. The first one (*Top Class I*, 11 ECTS)

addresses important contemporary issues in cell biology and the (bio)medical and pharmaceutical sciences. The knowledge is provided in a research-oriented way by discussing recent articles and presentations of current research during 5 weeks after an initial 2-week theoretical education in cell biology in which the students acquire the same basic level in cell biology knowledge. This acquaints students with the various research lines within the GUIDE research institute. In the second course (*Top Class II*, 9 ECTS), students continue within the research areas of GUIDE and get acquainted with scientific technology in biomedical and pharmaceutical research. Since the choice of a supervisor strongly influences the development and scientific training of a student, the third course (*Top Class III*, 4 ECTS) is designed to help students to make a considered choice of subject and supervisor for their first research project. In it, the students interview four to six senior researchers (from at least three different disciplines within GUIDE) about their research, research group, funding and (inter)national network. Based on the interview and additional information (publications and corresponding impact factor, h-factor, research history), the students have to judge the quality of these researchers and their research group. If the student's choice meets the "learning outcome" requirements of *Top Class III*, his/her first research project will be approved by the Board of Examiners. Before starting their research project, the students review the literature, elaborate on the research subject and questions, and prepare a plan. This results in an essay (*Research paper,* 3 ECTS), which can be used as the basis of the introductory chapter of the final report that has to be written at the end of the project. Then the students start their research project, perform experiments, evaluate the data obtained, adjust their questions and methods, reflect on additional experiments, collect and analyse new data, interpret the results and draw scientific conclusions. Ultimately, students write a report about the results of their project. In addition, they present the results in a colloquium (3 ECTS). During this presentation, it is important that the student shows the ability to take a 'helicopter view', including the clinical relevance of his/her project and the implications and societal impact of the results. The written report of the first research project (*Research project*, 30 ECTS) will be evaluated by the research supervisor and an external (independent) GUIDE principal investigator.

The second year of the programme starts with a course (*Top Class IV*, 5 ECTS) that prepares the students to successfully write an innovative research proposal. After *Top Class IV*, students continue with '*Capita Selecta*' (6 ECTS), a literature study on a topic in the field of (bio)medical and pharmaceutical sciences. Then they start their second research project (*Research Project II*, 30 ECTS). The criterion for this project is that the topic has to be substantially different from that of the first project, both theoretically as well as in terms of experimental approach, to ensure the development of broad and extensive interdisciplinary knowledge and skills. The procedure is the same as for the first research project, including the writing of a research paper (3 ECTS) preceding the start of the project and the concluding colloquium (3 ECTS). Students are strongly encouraged to go abroad for this project.

The curriculum contains a small elective part (5 ECTS) to acquire a specific skill or to extend the research project. The scientific knowledge and research skills acquired during the MPDI programme culminate in the final phase of the programme: designing their own PhD project. This phase involves writing a short research proposal, a tender (*Top Class V*, 2 ECTS), and a detailed, elaborated research proposal (6 ECTS). The topic of the project and corresponding expert supervisor depend on the student's own preference, but must be motivated by the student. A selected panel of experts from all research programmes within the GUIDE research institute evaluates the research proposals.

The critical reflection states that the MPDI programme has a well-considered structure, which is coherent in terms of acquisition of knowledge, development of scientific skills and

application of knowledge and skills. The concept of the programme is learning through active participation. The first courses are designed to introduce students to the research topics of the GUIDE research institute and to the skills necessary to participate in the scientific community. The programme continues with active participation in research. At the end of the two-year programme, the students prepare their own proposal for a PhD project. The final course is preceded by a course in writing project proposals. The committee is very impressed by the content of the programme. It praises the structure and large number of practical skills taught. However, it notes that insufficient attention may be paid to social competence skills. During the site visit, staff members endorsed this point.

During the site visit, alumni stated that the programme was quite rigid. They noted the lack of a possibility to focus on some topics of their interest in the form of electives. The management of the programme explained that due to the full curriculum, the programme offers no space for electives. On the other hand, students do have the opportunity to focus on topics of specific interest during their research project. The committee agrees with the management that in the current setting it is not feasible and necessary to expand the curriculum with elective courses.

2.3. Assimilation of the intended learning outcomes in the programme

One of the appendices of the critical reflection shows the relation between the intended learning outcomes and the courses. The committee studied this overview and concluded that the programme covers all the learning outcomes. The goal of the programme is to rapidly bring students who have already shown an excellent performance in the bachelor phase to a high-quality master's degree, where they already operate at the level of a starting PhD student. The committee endorses these opportunities the programme offers to the students.

In the interviews during the site visit, the committee extensively discussed the objective and intended learning outcomes of the programme in relation to its name. It concluded that the name of the programme covers the objectives and intended learning outcomes. Nevertheless, some theses were not recognisable as typical MPDI theses. The committee suggests having each thesis complemented with an appendix giving a perspective on drug research.

2.4. Scientific training

The MPDI programme is a research-driven programme, which trains the students to become independent researchers with a high level of interactive communication skills, characteristics of the utmost importance for top scientists of the future. The research programmes of the GUIDE research institute participating in the MPDI programme were recently audited by QANU and qualified as very good to excellent. Therefore the critical reflection states that the programme is embedded in a research environment of high quality.

In the master's programme, students develop the necessary professional skills of a researcher through the appropriate assignments and the two research projects. The assignments include oral and written presentations (throughout the programme), writing an editorial (*Top Class I*), designing an experiment to answer the self-defined research question (*Top Class II*), evaluating the quality of researchers and research (*Top Class III*), writing a literature review (*Capita Selecta*) and research proposals on a given (*Top Class IV*) or chosen topic (*Top Class V, Research Proposal*). In this way, students acquire fundamental scientific knowledge and skills such as critically evaluating the scientific literature, debating on scientific issues, and presenting research findings in a clear, critical and stimulating manner. They also learn how to judge and appreciate scientific quality.

The committee fully agrees that MPDI is a research-driven programme. It is positive about the way scientific training is implemented in the programme.

2.5. Academic staff and student-teacher ratio

One of the appendices to the critical reflection contains a list of the academic staff members. All scientific staff members participating in the MPDI programme have obtained their PhD degree, thus fulfilling the requirements for academic education. All staff members are engaged in research on the topics they also teach. Their main areas of research indicate that they have sufficient expertise to carry out the full programme. All staff members of the MPDI programme have a teaching and research task, including supervision and coaching of PhD students. Those participating in the MPDI programme meet the following quality criteria:

- Active participation in a GUIDE research programme receiving an average score of 4 or higher in the latest research visitation according to the Standard Evaluation Protocol;
- Active researchers with at least a 5-year track record on a clearly identified research theme about which they have published regularly (i.e. at least 8 publications in the previous 3 years) in highly ranked journals (top 25%) of the relevant field;
- Teaching staff need to be tenured staff at the level of assistant professor, associate professor or full professor;
- Staff members have successfully guided PhD students as 'promoter' or 'co-promoter'.

During the site visit the committee noted the extensive involvement and enthusiasm of the staff. It recognises the staff's scientific quality, national and international academic reputation and teaching experience. In addition, in the interview with students, the committee did not receive any signals of inadequate teaching qualifications. Students rated the English skills of teachers as good to excellent.

Because the number of students in the courses is kept low, there is always a lot of interaction between the teaching staff and the students. From the start of the programme, students are expected to participate in discussions with the lecturers and to prepare presentations (oral and written). The estimated student-staff ratio of the master's programme is 7.7. The committee is impressed by the favourable ratio, which will not be easily maintained with the expected increase in student intake.

The university declared the University Teaching Qualification (UTQ; in Dutch called 'Basis Kwalificatie Onderwijs', BKO) mandatory for all teaching staff of the University of Groningen (RUG). The Board of the University has decided that by 2015, 80% of all lecturers (employed by the RUG for at least three years) must have a UTQ. An increasing share of the teaching staff of the MPDI programme has completed this UTQ: currently, 25% of the teaching staff has obtained their UTQ, and another 20% of the teaching staff is currently participating in the course for the UTQ. Most other staff members will start the training soon. The committee states that an UTQ is a necessary condition for all teachers for training excellent students. Therefore, it advises all staff members to obtain their qualification as soon as possible.

2.6. Feasibility and tutoring system

Admission procedure and student intake

The MPDI master is primarily designed for highly ambitious and talented students who are interested in pursuing a career in scientific research. The programme aims to select students

from the top 10% of all bachelors' graduates from inside and outside the Netherlands. Therefore, the whole programme is taught in English.

Minimal requirements for admission are the following:

- A completed bachelor's degree affiliated to the (bio)medical or pharmaceutical sciences;
- Sufficient knowledge of the relevant sciences;
- Sufficient knowledge of the English language;
- A suitable attitude, motivation and talent to follow the master's degree programme.

Eligible students will have good to excellent results for the relevant subjects, including theoretical knowledge, practical laboratory skills and a bachelor research project. Ambition and talent should further be demonstrated by their motivation to participate in the MPDI programme, future ambitions in research, and additional research skills such as being a (co-) author of a scientific paper or a presenter at a scientific (inter)national congress. The Admissions Board decides whether the student has the proper attitude, motivation and talent to follow the MPDI master's programme on the basis of the documents supplied (university diploma and transcripts, curriculum vitae, motivation letter, letters of academic referents, and English proficiency) and an interview with a research presentation.

The programme aims at an intake of at least ten students per year. Since 2005, the intake has shown a steady increase, up to 15 in 2011. The maximal capacity of the programme (20 students) has not been reached yet. In particular, the number of applications from EU countries is low compared to Dutch and non-EU applications. According to the critical reflection, this might be due to the fact that the implementation of the bachelor-master system has only recently been completed in most European countries. To increase the number of EU applications, the Graduate School is establishing contacts with other European universities and intensifying its public relation activities in Europe. Recruitment from the foreign student cohorts has been vigorously intensified by means of the Abel Tasman Talent Programme (the internationalisation programme of the Graduate School), including forward-based selection at preferred partner institutions and international student fairs and the use of Research Vouchers (short-stay internships for talented students before unconditional admission). The committee notes that the experience gained in the selection process of new students is starting to bear fruit. It wants to stress the importance of continuing to focus on public relation activities.

Feasibility
The assigned study load (ECTS) determines the number of lectures and assignments and the amount of practical work planned by the course coordinators and theme teachers. During the site visit, students estimated they had a study load of 40-45 hours a week. They believe the study load is demanding, but not too difficult. The critical reflection states that during the programme the students have to meet a number of strict deadlines. As a consequence, especially at the beginning of the programme, students experience a heavy workload around those deadlines. Later in the programme, when students are more used to dealing with strict deadlines, they consider the workload normal. Students mentioned during the interview that especially foreign students have difficulties in the beginning, because of the differences in the educational system and lots of new information.

During each course evaluation the students are asked about the actual course load and whether it was in accordance with the planned load. If the evaluation outcome is

unfavourable, then the Study Programme Committee (SPC) can decide that the course must be changed. During the research projects, two 'mentor meetings' are scheduled between student, supervisor and mentor in which a SWOT (Strengths, Weaknesses, Opportunities & Treats) analysis of the student's performance is made in which the student 's progress is evaluated.

According to the critical reflection, the drop-out rate is low, and all students complete the programme in two years, confirming its feasibility (see appendix 4). The committee does not fully agree with this statement. It noted that more than 25% of the students dropped out after one year. However, based on discussions during the site visit the committee is convinced that this drop-out rate will be reduced, with improvements in the selection process by means of the Abel Tasman programme.

Mentoring system
Throughout the programme, students may consult the programme coordinator, and in the first part of the programme they may also consult the chair of the SPC. At that time, the chair functions as a mentor for the whole cohort. At the start of the first research project, each student is assigned to a mentor for the remainder of the programme. The mentor is a different person than the supervisor of the student's first research project and the mentor is responsible for the evaluation of the student's progress, abilities, and limitations. The mentor and student have at least two scheduled meetings during each research project. The mentor sends a report of each meeting about the student's progress, abilities, and limitations to the Board of Examiners. The student may consult the mentor whenever (s)he needs advice. The committee is positive with regard to this mentoring system.

During research projects, a permanent staff member closely and regularly supervises students. A daily supervisor will guide the student. The committee noted that the performance of the staff member and daily supervisor is not evaluated. In the interview, the programme coordinator stated that staff members are evaluated on their track record in supervising PhD students. The committee advises also evaluating their supervision of master students.

2.7. Quality management and programme-specific facilities
Nestor, the electronic environment of the university, offers students the opportunity to see all the information relating to the programme. During the research projects students participate in a research group. A working space is provided for them there, and the students may use the laboratory facilities of the research group. If necessary, they have access to specialized laboratory techniques, which are normally only accessible to the scientific staff. During its site visit, the committee established that the facilities available to students are excellent. Students are very pleased with them. They described the laboratories as spacious and with adequate equipment. They are also pleased with the number of computers and the availability of workstations for studying.

Student counselling in the master's programme commences with support information provided by the programme coordinator at the start of the programme. The programme coordinator is available for all of the students' questions with respect to the programme. The international offices of the Faculty of Medical Science, the Faculty of Mathematics and Natural Sciences and RUG deal with the questions related to visas, immigration and housing. The study guide contains all the information regarding student support and guidance. It refers international students to the International Service Desk (ISD), which is part of the Office for International Relations (Bureau Internationale Samenwerking, or BIS). In addition, the ISD assists foreign guests staying in Groningen, or those responsible for their stay, with any

queries they may have about issues such as regulations relating to foreigners, study advice, medical care, finance, accommodation, and facilities and official organizations within the city. Foreign students interviewed by the committee were very satisfied with the administrative support they received in the first period of their study.

Considerations
The committee studied the various aspects of the programme's teaching and learning environment: the curriculum, the staff and the facilities. It established that the curriculum is a good realization of the programme's intended learning outcomes. The curriculum is well-structured and well-balanced and prepares students perfectly for a career in scientific research. The committee appreciates the fact that the curriculum contains two research projects. However, the committee recommends to pay more attention to social competence skills.

The curriculum of the programme is based on a 'master-apprentice' relationship. The committee believes that this principle fits well with this master's programme. However, it has noticed that in daily practice the actual number of face-to-face moments between students and the principal investigators could be improved.

The committee was impressed by the enthusiasm, involvement and quality of the teaching staff. The services provided for the students, including a mentor, and the accessibility of the staff for the students add to the general impression that this is a good programme. Because the number of students in the courses is kept low, there is always a lot of interaction between the teaching staff and the students. The committee is impressed by the student/teacher ratio of 7.7. Currently, 25% of the teaching staff has obtained their UTQ, and another 20% is currently participating in the training course for the UTQ. The committee states that an UTQ is a necessary condition for all teachers for training excellent students. Therefore, it advises all staff members to obtain their qualification as soon as possible.

The committee established that the study load is quite demanding, but acceptable. It noted a relatively high drop-out of more than 25%. Nevertheless, it is convinced that the improved selection process at intake will lower this percentage. The maximal capacity of the programme (20 students) has not been reached yet. The committee advises the programme to keep focussing on public relation activities.

Conclusion
Master's programme Medical and Pharmaceutical Drug Innovation: the committee assesses Standard 2 as **good**.

Standard 3: Assessment and achieved learning outcomes

The programme has an adequate assessment system in place and demonstrates that the intended learning outcomes are achieved.

Explanation:
The level achieved is demonstrated by interim and final tests, final projects and the performance of graduates in actual practice or in post-graduate programmes. The tests and assessments are valid, reliable and transparent to the students.

Findings

Assessment system
The method of assessing a course is related to its nature. Courses in which knowledge is essential are assessed by written or oral examinations. Courses that train students' skills are assessed by assignments, presentations and reports. The intended learning outcomes of most courses refer to both knowledge and academic skills. Therefore, these courses are assessed using written or oral examinations as well as a literature study, assignments, or projects followed by a written and oral presentation. Since the programme is designed to prepare students for a career in science and since communication is crucial in science, all assessments are closely linked to the different forms of communication used in science.

The committee discussed the assessments during the site visit. The additional information provided during the site visit clearly showed diversity in the assessment methods. The quality of the examinations the committee inspected was good. The committee is of the opinion that the programme provides a balanced set of assessments.

The intended learning outcomes, teaching methods and methods of assessment are described on Nestor and explained at the start of each course. The "fixed" rules of the MPDI master's programme are defined in the Teaching and Examination Regulations. On a regular basis (at least once per year), the rules are discussed during the meetings of the Study Programme Committee (SPC) and are adapted as needed. Thus, the expected intended learning outcomes are clear to the students. During the site visit, the committee established that students have no complaints concerning the examination procedures. They consider the procedures to be transparent.

Master's theses
During the programme, students perform two research projects, both resulting in a written report. They learn how to run their own research project, based on their previous training in the courses. The written reports are evaluated by the research supervisor and an external (independent) GUIDE principal investigator. During each research project, two 'mentor meetings' are scheduled between student, supervisor and mentor in which a SWOT (Strengths, Weaknesses, Opportunities & Threats) analysis of the student's performance is made and his/her progress evaluated. The students are also encouraged to publish their findings. So far, 17 papers have been published using the results of projects to which MPDI students contributed. They are all in the top 25% of their research field. This indicates that the achieved learning outcomes of the MPDI programme match the expectations of the professional field.

The committee studied a selection of 5 master's theses from the list of the most recent master's theses (2009-2010 and 2010-2011 academic cohorts). The selection was made by the secretary on the basis of a range of marks for the theses. Student numbers of the selected

theses are provided in Appendix 6. The committee found that the theses it studied were of very high quality and got a general impression of high standards for graduation. According to the committee, the theses illustrate that the students have achieved the intended learning outcomes as formulated by the programme.

Board of Examiners
The Board of Examiners monitors the general quality of examinations and grades and thus provides an important tool of quality control in this programme. The committee noted the activities of the Board of Examiners in monitoring the quality of examinations. It considers the intentions of the Board of Examiners to be good, but feels that a considerable quality improvement should be made soon. It strongly recommends formalizing and documenting the existing processes, so that the review can be checked more easily.

At the end of the first year, the Board of Examiners evaluates the results and progress of all students. Since MPDI is a master's programme, which trains students for a career in science, the evaluation considers whether a student has the capacity to continue as a PhD student. This assessment is based on the results and progress during the first year. The weighted average grade, half of which is determined by the results of the first research project (30 of the 60 ECTS in total) is included in this evaluation, in addition to the advice from supervisors, mentors and MPDI staff members. Students with a weighted average grade of at least eight are considered to be potential candidates for a future PhD position. Those with a weighted average grade between seven and eight need to have shown progress during the first year and growth potential during their research project (supported by the supervisor). Those with a weighted average grade below seven are called in for a discussion about whether continuation in an alternative master's programme would suit them better. Transfer to another master's programme is managed by the study coordinator and the study adviser of the alternative master's programme, to avoid any study delay. During the site visit, the committee extensively discussed the rules, considerations and documentation of this interim selection procedure. It is convinced that the Board of Examiners handles this selection procedure very carefully.

The committee noted that the programme director was head of the Board of Examiners until last year. The committee states that this might cause conflict of interest. It realizes that the programme is small and the lines are informal. Nevertheless, the independence of the Board of Examiners is of great importance. The committee suggests that MPDI could consider to sign up with a Board of Examiners of another programme.

Alongside quality assurance, the Board of Examiners has the task of hearing appeals from students when they do not agree with an assessment. The Board also decides on measures to be taken in case of fraud. To prevent fraud, a plagiarism check programme is used. So far, no cases of fraud have been identified.

Professional Activities after Graduation
The quality of the programme is clearly expressed by the achievements of the graduates, who are doing very well and can contribute on a high level to this area in society. All but one of the graduates continued on as PhD student, indicating the high success rate in obtaining a PhD position. In general, graduates start their PhD immediately (September/October) after graduation (August). Since most graduates continue their PhD within UMCG, the MPDI programme has close contacts to the professional field. Some of the graduates start their PhD outside the UMCG, the majority at the Netherlands Cancer Institute. The committee noted that the faculty-wide decision to turn the four-year PhD programme into a three-year one for

MPDI students may lead students to choose another university for their PhD after they finish the MPDI programme in Groningen.

Considerations
The assessment methods are varied and enable the programme to establish whether students have acquired the intended learning outcomes. The assessments are valid, reliable and transparent.

The committee was rather impressed with the quality of the theses. It is of the opinion that the high grades are justified and reflect the high quality in general. The number of graduates who are accepted as PhD students also illustrates the quality of the programme.

The committee considers the intentions of the Board of Examiners in monitoring the quality of examinations to be good, but feels that a considerable quality improvement should be made soon. It strongly recommends formalizing and documenting processes and procedures, so that the review is more verifiable. Additionally, the independence of the Board of Examiners is of great importance. The committee suggests that MPDI could join with a Board of Examiners of another programme.

Conclusion
Master's programme Medical and Pharmaceutical Drug Innovation: the committee assesses Standard 3 as **satisfactory**.

General conclusion
The committee concludes that the objectives and intended learning outcomes of the master's programme Medical and Pharmaceutical Drug Innovation offered by the University of Groningen meet the standards required for an academic master's programme.

The committee is impressed by the programme in general, and has a few recommendations for further improvement.

According to the committee, the programme has an adequate assessment system and demonstrates that the intended learning outcomes are achieved.

Conclusion
The committee assesses the *master's programme Medical and Pharmaceutical Drug Innovation* as **satisfactory**.

Appendices

Appendix 1: Curricula Vitae of the members of the assessment committee

Prof. F.G.M. (Frans) Russel (chair of the committee) is Professor of Molecular Pharmacology and Toxicology at Radboud University Nijmegen Medical Centre (2000 - present) and chair of the department of Pharmacology and Toxicology. Furthermore, he is programme director of Biomedical Sciences and vice-dean of the Radboud Honours Academy. He graduated from the University of Groningen with a master's degree in pharmacy and pharmacist's certificate, and did his doctorate at the Radboud University of Nijmegen. He is also a member of the Health Council of the Netherlands and its Standing Committee on Health and the Environment, chair of the Postgraduate Education in Toxicology (PET) supervisory board, and fellow of the American Association for Pharmaceutical Sciences (AAPS). Russel was involved as a committee member in the site visits for Pharmaceutical Sciences (2005 - 2006) and Drug Innovation, University of Utrecht (2006). In addition, he was chair of the site visit committee that assessed the bachelor's programme in Life Science & Technology and the master's programme in Medical and Pharmaceutical Drug Innovation at the University of Groningen (2006).

Prof. H.J. (Henk-Jan) Guchelaar is Professor of Clinical Pharmacology at the LUMC (2003 – present), Professor of Clinical Pharmacology at the University of Leiden and head of the Department of Clinical Pharmacology and Toxicology at LUMC. He is also chair of the Concilium Hospital Pharmacy, vice-chair of the Dutch Society of Clinical Pharmacology and Biopharmacy, member of the committee to evaluate oncological agents of the Netherlands Association of Medical Oncology and member of the Central Committee on Research Involving Human Subjects (CCMO). He completed his registration as hospital pharmacist in 1992 and was awarded his doctorate in 1993 from the University of Groningen. He has worked since then as a hospital pharmacist in the Twente Medical Spectrum in Enschede and in the Academic Medical Centre (AMC). Between 1998 and 2003 he was head of the AMC Department Pharmacy and Educator.

Prof. A. (Alfons) Verbruggen is Professor of Radiopharmacy and Drug Analysis (1992 – present) and dean of the Faculty of Pharmaceutical Sciences at the Catholic University of Leuven. In addition, he is coordinator of the interuniversity post-graduate Master in hospital pharmacy in Flanders and head of the Radiopharmacy Department of the University Hospital Gasthuisberg in Leuven. He was awarded his doctorate in pharmaceutical sciences in 1975 and has published widely since then. He is also involved in various scientific societies, including the European Association of Nuclear Medicine, the European Society for Molecular Imaging and the Belgian Society of Nuclear Medicine. He was a member (since 1992) and chair (2001-2010) of the Group on Radioactive Compounds of the European Pharmacopoeia Commission and of the Working Party on Precursors for Radiopharmaceuticals (PRP group) of the European Pharmacopoeia Commission (since 2007).

M.J.M. (Marga) van Weelden-Hulshof is an independent pharmacist and since 2009 a member of the Supervisory Board of Mediq N.V. In addition, she is chair of the programme and priority theme committee of the National Diabetes Action Programme (2009 – present) and member of the Coordination Platform for Care Standards (2008 – present). In 2001-2008 she was successively member, vice-chair and chair of the executive board of the Royal Dutch Pharmacists' Association (KNMP). She graduated with a research degree in Pharmacy and obtained her pharmacist's certificate from the University of Utrecht and has several scientific publications to her name on research into aberrant genotypes in patients and the

consequences this has for the policy of prescribing antidepressants and antipsychotics. She is also a member of the site visit committee for medical services of the VG institution.

J.M. (Jantine) Brussee, BSc, is a master student of Bio-pharmaceutical Sciences at the University of Leiden. She obtained her bachelor's degree in Bio-Pharmaceutical Sciences in 2011. She was also a board member of the study association L.P.S.V. „Aesculapius", member of the programme committee for Bio-Pharmaceutical Sciences, member of the faculty council for the Faculty of Science and member of the Leiden Student Council. She was a student assistant for the Biochemistry I laboratory course (2009-2012), Medicines Development Trajectory (OTG, 2011) and Physiology (2011-2012) and actively involved in pharmaceutical education at the University of Leiden.

Appendix 2: Intended learning outcomes

The objectives of the master's degree programmes Medical and Pharmaceutical drug Innovation are:

- To prepare talented students for an independent scientific career,
- To make students develop skills, knowledge and insight in (bio)medical and pharmaceutical sciences, with a focus on insight in and approach to scientific problems,
- To make students develop the ability to clearly and concisely communicate the acquired knowledge to others.

These objectives are implemented in a programme that:

- Actively stimulate interdisciplinary cooperation in advancing science from a biomedical and pharmaceutical perspective,
- Is student focused and of high quality,
- Offers a small-scaled and international learning environment,
- Offers an inspiring academic learning environment (taking the highest scientific and ethical standards into account) with much interaction between excellent researchers and the demanding and heterogeneous student population.

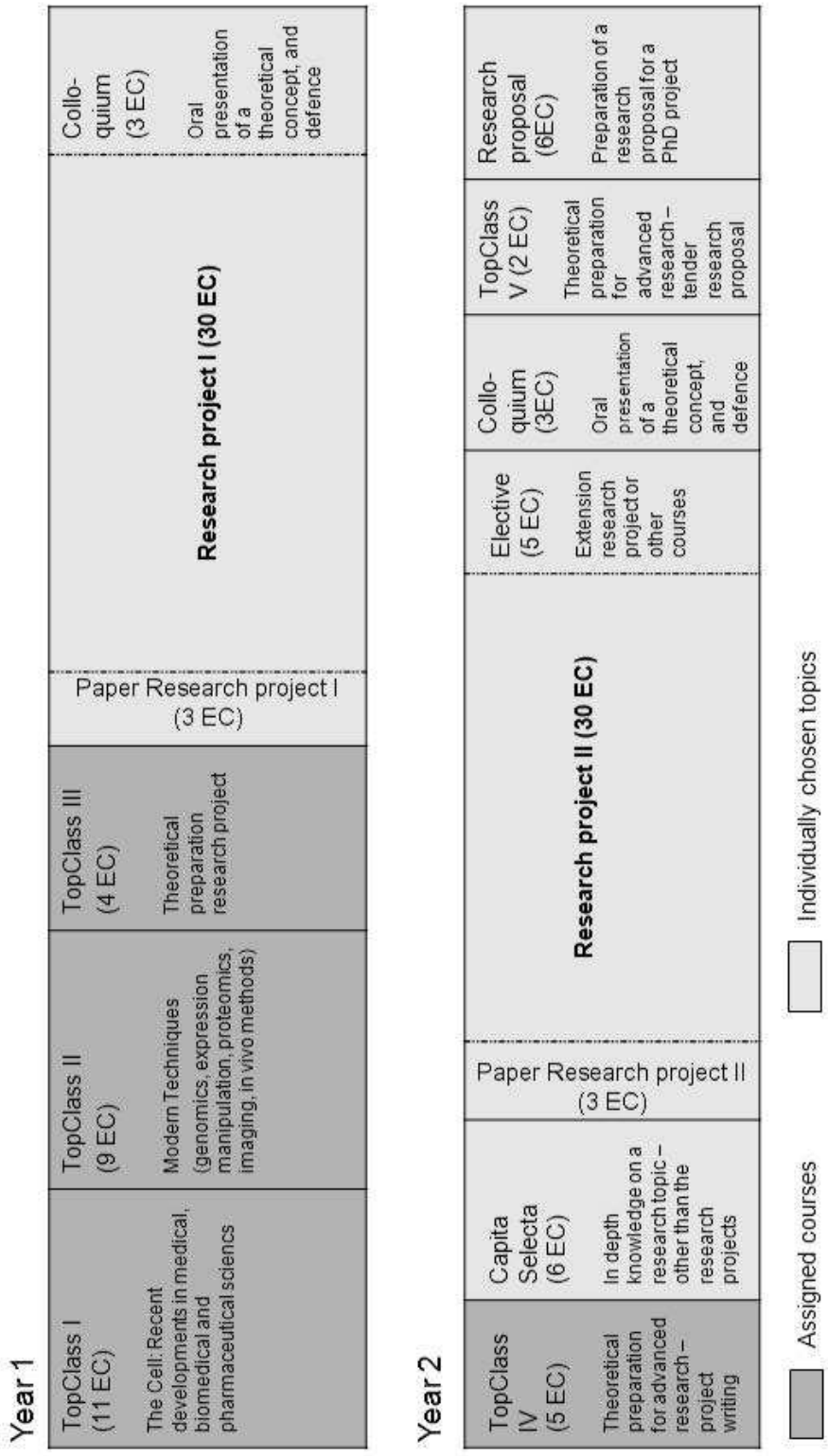
The objectives of the programme result in the following learning outcomes:

MSc students acquire

a) Knowledge of disease mechanisms in a number of specific disciplines, covered by the research programmes of the research institute GUIDE. These disciplines include cardiovascular diseases, oncology, liver, intestinal and metabolic diseases, kidney diseases, lung diseases, infectious diseases, (auto)immune disorders, transplantation, obesity and diabetes.
b) Knowledge and understanding of fundamental concepts of cell cycle regulation and cell proliferation, cell death and survival pathways, cell polarity, cellular signalling, immunology, macromolecule trafficking, membrane and organelle function, (advanced) genetics and genomics, stem cell biology, receptor pharmacology, drug delivery and targeting.
c) Advanced knowledge and skills on important modern techniques such as macromolecule separation and analysis (biomarkers), genomics & proteomics, bioinformatics, gene transfer, advanced animal models (transgene and knockout), advanced molecular imaging (optical imaging, in vivo imaging).
d) Knowledge of research evaluation methods, patent application and grant systems.
e) The ability to conduct and design scientific research in areas of medical and pharmaceutical drug innovation that are relevant to the advancement of knowledge and insights into fundamental and applied aspects of health and disease, such as:
    i. The ability to design and execute experiments, and interpret data, addressing problems in medical and pharmaceutical research,
    ii. The ability to translate a clinical or health-relevant problem or question into a rationally designed experiment to meet desired needs,
    iii. The ability to critically judge and evaluate existing knowledge and insights,
    iv. The ability to actively participate in a research group, including the academic debate.

f) An awareness of potential societal and ethical implications of scientific research in medical and pharmaceutical drug innovation and, in this context, an ability to critically evaluate the effects of their research.
g) The capacity to communicate effectively in written and verbal form to other researchers in the field and to lay persons.
h) The ability to collaborate in an interdisciplinary setting, i.e. clinicians, biological/biomedical and pharmaceutical researchers.
i) The ability to critically review international scientific research.
j) The ability to develop new concepts within the field of medical and pharmaceutical drug research.
k) To have an understanding of the requirements for a successful scientific career and the ability to judge whether the student fulfills these requirements.
l) Recognition of the need for, and an ability to engage in ongoing learning and development.
m) The capability of designing, presenting and defending their own research projects.

Appendix 3: Overview of the curriculum



Descriptions of all components of the curriculum are available in the online course catalogue Ocasys: http://www.rug.nl/ocasys/umcg/vak/showpos?opleiding=5147. The master's degree programme has no variants. All students follow the same programme. The individual choices of topics for the different parts within the programme (*research project I and II, Capita Selecta, Top Class V and the Research Proposal*) provide the student with more specialised knowledge on certain topics and skills in certain techniques.

Appendix 4: Quantitative data regarding the programme

Data on intake, transfers and graduates

Cohort	Enrolled	Continued in 2nd year (%)[1]	Granted degree	PhD UMCG / outside UMCG	If position outside UMCG: which institute	Other than PhD position
2005	5	2 (40%)	2	0/2	Netherlands Cancer Institute/ University of Utrecht	
2006	8	4 (50%)	4	2/2	Netherlands Cancer Institute/ UMC Utrecht	
2007	9	7 (78%)	7	5/2	Netherlands Cancer Institute/ VU Amsterdam	
2008	10	8 (80%)	8	4/3	AMC Amsterdam/ Hubrecht institute Utrecht/ UMC Utrecht	MSc degree programme Italy
2009	10	7 (70%)	6*	5/1	Netherlands Cancer Institute	
2010	8**	5 (71%)				

[1] Percentage of students who completed the first year with a positive advice to continue in the second year.
* One student combines the MPDI programme with Pharmacy. The student is expected to graduate in August 2012. ** One student quitted

Teacher-student ratio achieved

Academic year	Fte education*	Number of students	Fte/student	Staff-student ratio
2010-2011	1.1	8	0.14	1:7
2009-2010	1.3	10	0.13	1:7.7
2008-2009	1.3	10	0.13	1:7.7

* Teaching input is calculated as follows: supervisor research project: 48 hrs; Top Class coordinator: 40 hrs; theme or week teacher: 25 hrs; lecture + assignment: 8 hrs.

Average amount of face-to-face instruction per stage of the study programme

Year 1	ECTS	Total nr. face-to-face instruction	Nr. of weeks	Average amount of face-to-face instruction
TopclassI	11	103,5	8	13u/wk
TopclassII	9	142,5	6	24u/wk
TopclassIII	4	14,5	2	7u/wk
Paper Essay I*	3	4	2	2u/wk
Research project I *	30	44	22	2u/wk
Colloquium I *	3	12	2	2u/wk

Year 2	ECTS	Total nr. face-to-face instruction	Nr. of weeks	Average amount of face-to-face instruction
TopclasIV	5	11	4	3u /wk
Capita Selecta	6	9	4	2u/wk
Paper Essay II*	3	4	2	2u/wk
Research project II *	30	44	22	2u/wk
Colloquium II *	3	4	2	2u/wk
Topclass V	2	5	2	2,5 u/wk

Appendix 5: Programme of the site visit

Time	Part	Collocutors
Monday 8 october		
10:00 – 13:00	Preparatory meeting	
13:00 – 14:00	Management Pharmacy and MPDI	prof. P.J.M. van Haastert, portfolio holder in education Faculty of Mathematics and Natural Sciences prof. J.T.M. Elzenga, programme director Life Sciences Training College prof. dr. H.J. Haisma, programme director Pharmacy mw. dr. L. Westers, education coordinator Pharmacy mw. dr. K.E. Voskamp, policy officer Life Sciences Training College mw. dr. C.C.M. Schuiling-Veninga, lecturer prof. dr. L.F.M.H. de Leij, Dean of Research UMCG & Dean Graduate Schools University of Groningen; prof. dr. A.J. Moshage, programme director MPDI mw. dr.ir. D.F. Jansen, programme coordinator
14:00 – 15:00	Students Pharmacy	Mandy ter Avest Adri Bruinsma Ton van Heugten Pauline Lanting Hedy Maessen Janke Schuur Marjon Verschueren
15:00 – 15:15	*Break*	
15:15 – 16:15	Lecturers Pharmacy	dr. F. J. Dekker prof. dr. H.W. Frijlink mw. drs. W.I. van Leeuwen-Hangyi mw. dr. B.N. Melgert prof. dr. K. Poelstra mw. dr. C.C.M. Schuiling-Veninga mw. prof. dr. K. Taxis
16:15 – 17:00	Students MPDI	Rieza Aprianto, second year student from Indonesië Katja Becker, second year student from Germany Rogier van der Stijl, second year from the Netherlands Els Kuiper, second year student from the Netherlands Alejandra Hernandez Segura, first year student from Mexico Gabriela Tapia Calle, first year student from Columbia
17:00 – 17:15	*Break*	
17:15 – 18:00	Lecturers MPDI	mw.prof. dr. M. Schmidt, Molecular Pharmacology (*Topclass III*) dr. S.C.D. van IJzendoorn, Cell biology (*Topclass I*) prof. dr. ir. E.A.A. Nollen, Molecular Genetics (*Topclass II*) prof. dr. J.M. van Dijl, Medische Microbiologie (*Topclass IV, V, Research Proposal*) prof. dr. K.N. Faber, Experimental Gastric enterology and Hepatology (*Topclass V, research proposal*) prof. dr. W. J. Quax, Pharmaceutic Biology (*Topclass I*)
18:00 – 18:30	Alumni Pharmacy	dhr. J. Baltink (graduated 2009) dh.r F. Grasmeijer (graduated 2009) dhr. A. Janse (graduated 2011) mw. A. Lexmond (graduated 2010) mw. J. Vogelzang (graduated 2011)
18:30 – 19:00	Alumni MPDI	Katarina Ochodnicka – Mackovicova, PhD AMC (graduated 2010) Marta Capala, PhD UMCG (graduated 2009) Annemiek van der Goot, PhD UMCG (graduated 2008) Sepp Jansen, PhD UMCG (graduated 2011)

Tuesday 9 October		
08:30 – 09:00	Preparatory meeting	
09:00 – 09:45	Study Programme Committee students and lecturers Pharmacy	Pim de Haan, student Fianne van Loveren, student dr. N. Pras, lecturer mw. prof. dr. M. Schmidt, lecturer mw. dr. L. Westers, official secretary dr. H.J. Woerdenbag, secretary
09:45 – 10:15	Study Programme Committee students and lecturers MPDI	mw.prof. dr. M. Schmidt, Molecular Pharmacology (chair committee) dr. S.C.D. van IJzendoorn, Cell Biology dr. F.J. Dekker, Pharmaceutical Gene Modulation dr. B. van de Sluis, Molecular Genetics Andrea Garcia Perez, second year student from Mexico Els Kuiper, second year student from the Netherlands
10:15 – 11:00	Board of Examiners, study advisor, Pharmacy	mw. drs. Y. Benjamins, internship coordinator dr. J. Hille, member Board of Examiners dr. P.F. van Hutten, study advisor mw. dr. B.N. Melgert, member Board of Examiners mw. dr. K.T.A. Pilon, member Board of Examiners mw. prof. E.M.J. Verpoorte, vice chair Board of Examiners mw. dr. L. Westers, official secretary Board of Examiners mw. drs. S. van Duin, study advisor
11:00 – 11:15	*Break*	
11:15 – 12:00	Board of Examiners, study advisor, MPDI	prof. dr. R.P.H. Bischoff, Analytical Biochemistry prof. dr. A.J. Moshage, member Board of Examiners mw. Dr.ir. D.F. Jansen, official secretary Board of Examiners
12:00 – 12:45	Guided tour Consultation hour	
12:45 – 13:30	*Lunchbreak*	
13:30 – 14:00	Preparation of final meeting	
14:00 – 15:00	Final meeting with management Pharmacy and MPDI	prof. dr. P.J.M. van Haastert, portfolio holder education Faculty of Mathematics and Natural Sciences prof. dr. J.T.M. Elzenga, programme director Life Sciences Training College prof. dr. H.J. Haisma, programme director Pharmacy mw. dr. L. Westers, education coordinator Pharmacy mw. dr. K.E. Voskamp, policy officer Life Sciences Training College mw. dr. C.C.M. Schuiling-Veninga, lecturer prof. dr. L.F.M.H. de Leij, Dean of Research UMCG & Dean Graduate Schools University of Groningen; prof. dr. A.J. Moshage, programme director MPDI mw. dr.ir. D.F. Jansen, programme coordinator
15:00 – 17:00	Compose preliminary findings	
17:00 – 17:15	Presentation of the preliminary findings by committee chair	
17:15 – 17:45	*Drinks*	

Appendix 6: Theses and documents studied by the committee

Prior to the site visit, the committee studied the theses of the students with the following student numbers:

Master programme Medical and Pharmaceutical Drug Innovation

1946196
1615157
1716182
1717790
2049007

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

- Examination task and completed examinations of the task "molecular biology of the cell" (*Top Class I*)
- Written reports made by students in *Top Class III*
- Research proposals made by students in *Top Class V* (Tender) and in *Research Proposal*
- All material of *Top Class I and IV* (for instance course information, time tables, exams)
- Information material about MPDI and the University of Groningen
- Self-evaluation of graduate school GUIDE
- Reports of consultations with relevant committees/organs (Board of Examiners, Study Programme Committee)
- Relevant management information

Appendix 7: Declarations of independence

nvao
nederlands - vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: Prof.dr. F.G.M. Russel

PRIVÉ ADRES: Gerit van Duranstraat 3
6525 DR Nijmegen

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:
Farmacie

AANGEVRAAGD DOOR DE INSTELLING:
Universiteit Utrecht en
Rijksuniversiteit Groningen

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

1

nvao
nederlands - vlaamse accreditatieorganisatie

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Nijmegen DATUM: 09/03/12

HANDTEKENING:

2

nvao
nederlands - vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: VERBRUGGEN ALFONS

PRIVÉ ADRES: Korte Holsbeeksesteenweg 90
B-3012 WILSELE (België)

IS ALS DESKUNDIGE / ~~SECRETARIS~~ GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:
Farmacie

AANGEVRAAGD DOOR DE INSTELLING:
QANU (NL)

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

1

nvao
nederlands - vlaamse accreditatieorganisatie

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Wilsele DATUM: 18/2/2012

HANDTEKENING:

nvao
nederlands-vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: H-J Gudelaar

PRIVÉ ADRES: Van Bergen Yzendoornpark 23
2801 AB Gouda

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:

Farmacie (bachelor & master)

AANGEVRAAGD DOOR DE INSTELLING:

Groningen & Utrecht

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

nvao
nederlands-vlaamse accreditatieorganisatie

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Gouda DATUM: 14-02-2012.

HANDTEKENING:

nvao
nederlands-vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: M. J. M. van Weelden - Hulshof

PRIVÉ ADRES: Sprielderweg 51
3881 PA Putten

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:

Bachelor en Master Farmacie in Utrecht en Groningen

AANGEVRAAGD DOOR DE INSTELLING:

QANU

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

1

nvao
nederlands-vlaamse accreditatieorganisatie

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Putten DATUM: 12 maart 2012

HANDTEKENING:

nvao
nederlands - vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: J.M. Brussee

ADRES: Hogewoerd 164 k3
2311 HW Leiden

IS ALS DESKUNDIGE / ~~SECRETARIS~~ GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:

ZIE BIJLAGE

AANGEVRAAGD DOOR DE INSTELLING:

ZIE BIJLAGE

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

nvao
nederlands - vlaamse accreditatieorganisatie

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

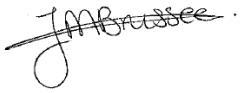
VERKLAART STRIKTE GEHEIMHOUDING TE Bbetrachten VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Leiden

DATUM: 04-04-2012

HANDTEKENING:



G036g

nvao
nederlands - vlaamse accreditatieorganisatie

ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING

INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: Annemarie Veneman

PRIVÉ ADRES:
Vendellaan 58
2332 AH Leiden

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:

- BA + MA farmacie
- Medical and Pharmaceutical Drug Innovation

AANGEVRAAGD DOOR DE INSTELLING:

RUG

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDEELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDEN KUNNEN BEÏNVLOEDEN;

1

nvao

VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Leiden

DATUM: 20 september 2012

HANDTEKENING:

2