1. Introduction

The four-year PhD training programme aims at delivering competent PhD’s for academia and other research institutes, society as well as industry, in particular the pharmaceutical industry. The training programme is obligatory for all PhD students who enrol in the PhD programme of AIMMS (www.aimms.vu.nl).

The main focus of the PhD study is on carrying out research in one of AIMMS’ divisions. As a part of the training programme, PhD students are obliged to follow an educational programme of courses aimed at increasing general knowledge in the basic molecular human life sciences to translational molecular medicine. It offers the possibility to broaden the specific areas of expertise, from fundamental chemistry to dedicated biomarker design or from system biology approaches to drug design and clinical applications. Where appropriate, also courses in other areas of science can be included on an individual basis.

Furthermore, all PhD students have (limited) teaching duties in AIMMS-related BSc- and/or MSc-curricula, thereby gaining experience in teaching and other forms of knowledge transfer.

The PhD training programme takes into consideration that the PhD students have different backgrounds, ranging from pharmaceutical sciences to biology, medical biology, computer science and informatics, chemistry or medicine. Therefore, a PhD training programme will be specified according the needs and interests of each individual PhD student. The aim of the training programme is twofold, taking into account what is required to eliminate deficiencies and acquire new skills required for the research project.

The PhD student will ultimately be awarded with a PhD-degree when the PhD programme has been completed and a PhD thesis has been approved and publicly defended.

The VU Doctorate Regulations* (Promotiereglement, 1 January 2015) of the Vrije Universiteit and the ‘PhD Education Guidelines’ of FEW/FALW** (07 July 2015, amended April 2016) are important background documents for the current PhD training programme of AIMMS. In those documents specific ‘Exemptions’ are described, e.g. for ‘external’ PhD-candidates and PhD-students with 3-year’s contracts.


1.2. The organization to which the PhD student formally belongs

The PhD students of the AIMMS graduate school, are embedded in the PhD-programmes of the
constituting AIMMS departments/groups within the faculty of Sciences (FEW: Chemistry & Pharmaceutical Sciences (CPS) and BioInformatics (BiolInf)) and of Earth and Life Sciences (FALW: Molecular Cell Biology (MCB)) of the Vrije Universiteit Amsterdam. Their research projects are part of the AIMMS research program.

For the PhD students who work primarily within one of the AIMMS groups, the respective head of department (AHO; chairman of the sub-PhD committee) of this group has the ultimate and formal responsibility guarding progress of the PhD program, on behalf of the Faculty Board. The AHO delegates this responsibility to the director of AIMMS. For those students who work mainly outside the laboratories of the AIMMS divisions, the ultimate responsibility will have to be decided; the professor involved as main supervisor is obliged to take care of this before admission of the PhD student, this in agreement with the director of AIMMS.

2. The PhD Training Programme

The PhD graduates have achieved the following general competences:

- To do research independently and to set up original research projects;
- To publish their findings in high quality journals and to give presentations about their projects;
- To be able to fill knowledge-intensive positions in Society, requiring advanced analytical and integrative abilities, specialized knowledge and capacities to understand and direct complex, science-intensive activities.

The main objectives of the four year’s PhD training programme are, therefore, to enable the student to:

- Design, direct and interpret experimental work, involving independent use of scientific methodology resulting in writing a PhD thesis to be defended in public;
- Interpret the results of research projects in the broad perspective of molecular / computational / pharmaceutical / human life sciences;
- Apply methods for literature research and evaluate the quality of scientific publications;
- Present scientific results at national and international meetings through posters and oral communications;
- Give guidance to laboratory personnel and undergraduate students

3. Structure of the PhD training programme

The PhD training programme is based upon three elements, which are designed for each individual student:

A. Research training, internal or external, and including communication of knowledge
B. Research oriented courses
C. Teaching of undergraduate students

3.1. Responsibilities

The PhD training programme is formally the ultimate responsibility of the two heads of department (AHOs) within AIMMS, namely of the departments of Chemistry & Pharmaceutical Sciences (CPS) of the faculty of Science (FEW) and the department of Molecular Cell Biology (MCB) of the faculty of Earth and Life Sciences (FALW). The AHOs (chairmen of the respective sub-PhD committees) delegate
the responsibility to the director of AIMMS, who is assisted by the managing director of AIMMS.

The PhD research project is the direct responsibility of the promotor, a professor in one of the AIMMS divisions.

The daily supervision will be the responsibility of the direct supervisor, who is one of the staff members of the AIMMS division. This can be the promotor or one of the associate/assistant professors.

3.2. The PhD research project
The PhD research project is approved by the prospective promotor. The PhD position may be funded by the university ("eerste geldstroom" or 1GS), NWO/STW or specific research foundations (2GS), industry (3GS), European union (4GS), or other grants: all PhD-students are being treated equally.

Project approval is based on the following criteria:
- It enables the student to show his/her own creativity;
- It allows the student in due course to add his/her own innovative input;
- The high-risk aspects should be limited, so that the risk of failure because of that aspect is absent;
- The required expertise and equipment is sufficiently available or can easily be acquired;
- Adequate supervision can be guaranteed;
- It can be finished (including writing of most of the PhD thesis) within a maximum of 4 years.

3.3. Selection of a PhD student
The PhD student will be selected by the prospective supervisor and/or promotor. The PhD candidate will have an MSc diploma in a relevant area. Selection will be based on past performance of the candidate (MSc research project, references) as well as aspects like creativity, ambition, independence, abilities of written and oral presentations. The position will be full time for maximum 4 years, according to VU guidance and rules. It may include a research period at another laboratory in the Netherlands or abroad.

For PhD students who have a three-year contract and "part-time" or "external" PhD students, an individual assessment will be made in each case, depending on the prior degree(s), research training and research experience of the candidate.

3.4. Research training and PhD thesis
During the first four months of the AIMMS PhD training programme, the PhD student is required to present his/her preliminary research plan in a research group meeting of the division where the research project will be conducted.

This plan comprises:
- A description of the research, including objective, hypothesis and theoretical background of the research project;
- A planning and contents of the experimental work including a prediction of the potential outcome of the first experiments;
- An indicative time planning for the research

During the course of the research project, the PhD student is provided with support and guidance by his/her individual supervisors. Special attention is paid to obtaining experience in research
methodology, preparation of scientific articles and communication skills. The supervisor(s) will actively coach PhD students to master a range of writing and presentation skills so that the student will become a more effective communicator. Research results are discussed regularly at research group meetings. Each PhD student will thereby gain experience and actively contribute to the training of colleague PhD students by giving feedback to one another on the basis of reasoned argumentation, clear presentation etc.

The formal procedure, installed by the Faculties FEW/FALW and AIMMS and supervised by director of AIMMS, demands the PhD student and supervisor(s)/promotor to give yearly an overview of the project and the progress made by the PhD student with respect to his/her training and research programme. Ten months after the start of the project the supervisor(s)/promotor together with the PhD student advise the director of AIMMS on the feasibility of the project and the quality of the student. Most of the time, the project will continue as foreseen, but in case of e.g. lack of quality of the student, a PhD contract can be discontinued after the first year. The PhD student may appeal against that decision with the director of AIMMS.

One year after enrolment in the PhD training programme, the PhD student will present his/her definitive research project in a research group meeting of the respective division. The presentation comprises the results of the first year’s investigations and a presentation of plans for the remaining three years.

During the course of the research project, PhD students attend national and international symposia and seminars. These meetings provide an opportunity to improve skills such as:

- Writing a paper
- Preparing an abstract
- Collecting and selecting data
- Preparing and presenting a conference poster
- Arranging an oral presentation, using (audio)visual aids handling questions during the discussion

During the course of the research project PhD students have the possibility to perform part of their research and/or follow training in research groups abroad.

The research project will be concluded by a PhD thesis which has to be written in English by the student and this is, in principle, based on two papers accepted/published and one to be published, or more, in the international scientific literature (peer reviewed journals, in the top-20 percentile of the field, with an impact factor > 2.0).

The PhD student should be “manager” of his/her own project: he/she has his/her own responsibility for his/her project and should not become too dependent on his supervisor. After all, he/she is to become an independent researcher!

3.5. Supervision

In line with the FEW/FALW PhD Education Guidelines (July 2015, amended April 2016), at least one of the full professors of AIMMS will be the promotor. In some cases two promotors may be involved, including a second promotor from a group directly involved in the research. In the latter case, it should be made clear to the student who is responsible for which part of the project. Usually there will be a co-promotor as well: one of the assistant/associate professors, who in many cases wrote the project proposal and takes care of the daily supervision of the PhD student. In certain cases there may be two co-promotors; again it should be made clear to the student who is responsible for which part of the student’s activities. A maximum of 3 (co)-promotors is allowed by university regulations.
Often daily supervision will be done by one of the permanent assistant/associate professors of a division. Promotor and supervisor/co-promotor should guarantee that the PhD student is provided with a concise description of the project, that he/she is thoroughly introduced in the subject (practice and theory) and that the required equipment and facilities are available for the student's project.

In the course of the PhD project, the emphasis of the supervision should shift from direct steering of the project to supervision at some distance, reflecting maturation of the graduate student. The PhD student should regularly present his/her data in research discussions within the division and at workshops/conferences. Publications should be written by the student him/herself, but edited carefully and rapidly by supervisor/co-promotor and promoter.

In case of problems or conflicts between the PhD student and supervisor/co-promotor or promotor, the PhD student may contact the director of AIMMS to mediate and secure the progress of the PhD programme.

3.6. Monitoring of progress

According to FEW/FALW Education Guidelines, between 10 and 12 months after start of the project a go/no go decision for continuation will be taken; usually the project will be continued. Once every year the supervisor/co-promotor and promotor will discuss in a formal session ("jaargesprek"), the progress of the project, the training programme and the quality of supervision. The results of this session/"jaargesprek" are noted on special evaluation forms for the PhD-programme, signed by all parties and sent to the director of AIMMS.

3.7. Training and supervision plan (TSP) requirements, courses and credit points

Within the first three months the PhD student, together with the promotor and supervisor(s), devise a PhD training and supervision plan (TSP), which suits his/her specific needs and wishes. This can be updated every year with the yearly evaluation/"jaargesprek". Also 'external' PhD students that will receive a diploma from the Vrije Universiteit will have to provide a PhD TSP. The following training options exist:

- Advanced courses organized by AIMMS or AIMMS groups, recognized Research Schools, such as HRSiMC or other (recognized) organizations (e.g. ULLA or Marie-Curie ITNs) which are of primary interest to the agreed research programme;
- Other options, e.g. courses to eliminate any deficiencies in skills necessary for conducting the experimental work and/or to better understand the theoretical framework of his or her research project;
- General skills training, e.g. time management and planning, scientific writing course, presenting.
- Any other course, which is of individual interest of the student to broaden his or her scope in the relevant field of sciences.
- Teaching / didactic courses

The PhD TSP can be adapted to individual needs and interests during the course of the research project.

The PhD student and his/her supervisor(s) are responsible for the registration of the participation in this training programme. During evaluation sessions with the supervisor(s), the training programme and PhD research are discussed. If lecture courses (e.g. capita selecta in a BSc programme) are part of the training programme of the PhD student, he/she has to pass the corresponding examinations. There will be no formal examinations after attendance of certain advanced courses. Credit points for courses followed can be registered via certificates and/or the signed exam-forms.
4. Courses (mandatory and optional) and credit points

In line with the FEW/FALW PhD Education Guidelines, a PhD-student is required to achieve a training programme, which consists of **30 credit points (ECs) throughout his/her PhD trajectory**. The following course types are distinguished:

**A. Scientific integrity:** A mandatory course for each PhD candidate (internal and external). Minimum of 2 EC.

**B. General skills courses and activities:** Courses may include scientific writing, presentation, management skills or similar courses. Other activities are (formal) training for education (e.g. of BSc and MSc students), participation in representative councils, participation in BSc/MSc information days, organisation of community events such as conferences.

**C. Scientific specialization courses:** Courses include methodological skills courses, training courses and programs for complex instruments, capita selecta courses, participation in AIMMS seminars and Journal Clubs. Capita selecta courses may be given on an individual basis.

**D. Research-related activities:** Activities include attendance of seminars, visit to conferences, presentation of lectures and posters, participation in (AIMMS) workshops.

In the **Appendix 1**, an indicative list of existing courses (not complete) and the credit points allocated to the courses is provided. These credit points are based on the duration of the courses, as well as the student’s workload required to prepare for and complete the course. Usually, the student gets one credit point per course day. For specific courses organized by other (recognized) Research Schools (Appendix 2, e.g. HRSMC) or other (recognized) organizations (e.g. ULLA, Marie-Curie ITNs), credit points are allocated after consultation with the supervisor. Several courses are free of charge. However, if a course requires a course fee, the promotor/supervisor will have to judge if the division’s funds for graduate training allow participation in the course. It should be stressed, however, that funds are limited.

In order to ensure that each PhD candidate participates in each of these course types, the following **minimum/maximum credit points/ECs** are specified:

- A: 2 ECs
- B + C: min 8 EC, max 20 ECs
- D: min 8 EC, max 20 ECs

For PhD students who have a three-year contract and “part-time” or “external” PhD students, an individual assessment will be made in each case, depending on the prior degree(s), research training and research experience of the candidate.

5. Teaching of undergraduate students

As part of their training, all PhD students are involved in teaching of BSc-/MSc-students. The amount of time spent supervising undergraduate students should not exceed 15% of the time on average over the 4-year period.

Based on experience and interest the students are appointed to assist at a specific part of the undergraduate programme (mainly practical courses) for a period of three years. The main task of
PhD students in the education of undergraduates is transferring knowledge and expertise, monitoring practical sessions and evaluation of undergraduate students' performance. Furthermore, usually each PhD student supervises one or two undergraduate students during a research traineeship of 3 - 10 months. PhD students are coached by their supervisor(s) during the course of their teaching tasks.

On a regular basis, an evaluation of the PhD training programme takes place in meetings of the supervisor(s) with PhD students. In these meetings relevant general aspects of the training programme are discussed, such as:

- Research training
- Course programme
- Requirements for new courses, activities etc.
- Teaching of undergraduate students

6. Duties and responsibilities

The promotor
- Is responsible for the PhD project and process normally leading to a PhD thesis
- Has ultimate responsibility for supervision
- Stimulates/challenges creativity of PhD students
- Stresses the importance of on time preparation of the PhD thesis
- Promptly reviews concept articles and thesis chapters.
- Organizes the PhD defence session
- Has ultimate responsibility for the PhD training programme of each student
- Discusses career perspectives with student

The supervisor
- Is responsible for the daily supervision of the PhD student
- Is responsible for instruction of oral and written presentation skills
- Is responsible for on time preparation of PhD thesis
- Prepares and discusses the training programme with PhD student
- Regularly discusses progress with student
- Oversees teaching duties of the student
- Teaches the PhD student how to write scientific articles and reviews them promptly (together with promotor)
- Makes sure that required equipment and other facilities are available

The PhD student
- Plans and performs research, ultimately leading to a PhD thesis
- Prepares a PhD thesis on time (within 4 years)
- Regularly discusses progress with supervisor and promotor
- Presents a poster once a year for the AIMMS Annual meeting
- Participates in scientific conferences, usually presenting a poster
- Writes scientific articles and chapters for thesis (including first drafts!)
- Actively participates in research discussions of division or AIMMS
- Participates in the teaching programme of the division or AIMMS
- Orients him/herself in time on next step in career
The AIMMS director

- Is mandated by the Department heads (AHOs) to execute all aspects of the AIMMS PhD training programme according to the FEW/FALW and University rules and guidelines
- Is advised by the promotor/supervisor on the annual progress of individual PhD students
- Keeps a file on the progress of each PhD student
- Actively helps to resolve problems or complaints of PhD students, e.g. with their supervisor(s)/promotor
- Escalates significant problems and/or violations to the respective Head of Department (AHO), chairman of the respective sub-PhD committee ultimately responsible for the proper execution of the PhD Education programme of FEW/FALW.

Practical information:
For practical information, including FEW/FALW procedures, guidelines, official forms, incl. a TSP form, see: https://vunet.login.vu.nl/services/pages/practicalinformation.aspx?cid=tcm%3a164-413614-16
# Appendix 1: Indicative list of Course elements and corresponding ECs*

<table>
<thead>
<tr>
<th>Course element</th>
<th>EC</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Mandatory courses (minimum 2 EC)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific integrity</td>
<td>2</td>
<td><a href="http://www.few.vu.nl/en/phds/phd-courses/index.aspx">www.few.vu.nl/en/phds/phd-courses/index.aspx</a></td>
</tr>
<tr>
<td><strong>B. General skills (B+C: minimum 8, maximum 20 EC), from FEW/FALW guidelines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific writing, presentation, management skills</td>
<td>PM</td>
<td>EC according to course leader specification</td>
</tr>
<tr>
<td>Training for education</td>
<td>3</td>
<td>Certificate of formal course is provided</td>
</tr>
<tr>
<td>Participation in representative councils</td>
<td>2</td>
<td>Examples: OR, ODC, ProVU, PhD Council</td>
</tr>
<tr>
<td>Participation in BSc/MSc Information days</td>
<td>2</td>
<td>Confirmation by head Marketing &amp; Communication (M&amp;C)</td>
</tr>
<tr>
<td>Organization of community events</td>
<td>2</td>
<td>Organization of conferences etc.</td>
</tr>
<tr>
<td>Writing and submission of Rubicon or comparable grant application</td>
<td>2</td>
<td>Confirmation by supervisor</td>
</tr>
<tr>
<td><strong>C. Scientific specialization (B+C: minimum 8, maximum 20 EC) (selected)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIMMS Post-doctoral / graduate courses (1 week full time)</td>
<td>2</td>
<td>Detailed specification by course leader, <a href="http://www.aimms.vu.nl/en/education/phd-programme/index.aspx">www.aimms.vu.nl/en/education/phd-programme/index.aspx</a></td>
</tr>
<tr>
<td>VU university Master courses of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Biomolecular sciences (BMS)</td>
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<tr>
<td>- Chemistry (CHEM)</td>
<td></td>
<td></td>
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<tr>
<td>- Drug Discovery &amp; Safety (DDS)</td>
<td></td>
<td></td>
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<tr>
<td>- Medical Natural Sciences (MNS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ULLA Summer School for Pharmaceutical Sciences (abroad)</td>
<td>3</td>
<td><a href="http://www.ullapharmsci.org/summer-schools/">www.ullapharmsci.org/summer-schools/</a></td>
</tr>
<tr>
<td>HRSMC Post-doctoral/graduate courses</td>
<td>PM</td>
<td><a href="http://www.hrsmc.nl/education">www.hrsmc.nl/education</a></td>
</tr>
<tr>
<td>BioSB research school (founded by NBIC and NCSB)</td>
<td>PM</td>
<td><a href="http://www.biosb.nl/education/course-portfolio-2/">www.biosb.nl/education/course-portfolio-2/</a></td>
</tr>
<tr>
<td>Participation in colloquia, seminars, etc (n=5)</td>
<td>1</td>
<td>Confirmation by supervisor; per attended meeting half-page summary</td>
</tr>
<tr>
<td>…………………</td>
<td>PM</td>
<td></td>
</tr>
<tr>
<td><strong>D. Research-related activities (minimum 8, maximum 20 EC)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conference visit</td>
<td>1</td>
<td>Confirmation by supervisor</td>
</tr>
<tr>
<td>Poster at conference</td>
<td>1</td>
<td>Confirmation by supervisor</td>
</tr>
<tr>
<td>Lecture at conference</td>
<td>1</td>
<td>Confirmation by supervisor</td>
</tr>
<tr>
<td>Participation in workshop</td>
<td>2</td>
<td>Confirmation by supervisor</td>
</tr>
</tbody>
</table>

* Based on FEW/FALW PhD Education Guidelines
## Appendix 2: Graduate schools (national) and consortia recognized by Faculty Boards*

<table>
<thead>
<tr>
<th>Graduate school</th>
<th>Leading institution</th>
<th>VU Department involved</th>
<th>Responsible contact person</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONWAR</td>
<td>VU Amsterdam</td>
<td>Neurosciences</td>
<td>Prof. Guus Smit</td>
</tr>
<tr>
<td>SIKS</td>
<td>VU Amsterdam</td>
<td>Computer Science</td>
<td>Prof. Henri Bal</td>
</tr>
<tr>
<td>SENSE</td>
<td>VU Amsterdam</td>
<td>IvM</td>
<td>Dr. Ad van Dommelen</td>
</tr>
<tr>
<td>HRSMC</td>
<td>UvA</td>
<td>Chemistry &amp; Pharmaceutical Sciences</td>
<td>Prof. Matthias Bickelhaupt</td>
</tr>
<tr>
<td>ASCI</td>
<td></td>
<td>Computer Science</td>
<td>Prof. Hans Akkermans</td>
</tr>
<tr>
<td>Subatomic Physics, Theoretical Physics</td>
<td>FOM</td>
<td>Physics</td>
<td>Prof. Piet Mulders</td>
</tr>
<tr>
<td>WTMC</td>
<td>Maastricht University</td>
<td>Athena</td>
<td>Prof. Joske Bunders</td>
</tr>
<tr>
<td>EMGO+</td>
<td>VU Amsterdam</td>
<td>Health Sciences</td>
<td>Prof. Maurits van Tulder</td>
</tr>
<tr>
<td>Amsterdam graduate school of Physics</td>
<td>VU Amsterdam &amp; UvA</td>
<td>Physics</td>
<td>TBD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consortium</th>
<th>Leading institution</th>
<th>VU Department involved</th>
<th>Responsible contact person</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULLA consortium</td>
<td>Leuven University</td>
<td>Chemistry &amp; Pharmaceutical Sciences</td>
<td>Prof. Nico Vermeulen</td>
</tr>
</tbody>
</table>

* Based on FEW/FALW PhD Education Guidelines