SCHOOL OF CHEMICAL ENGINEERING AND ANALYTICAL SCIENCES

Faculty of Engineering and Physical Sciences

Doctoral Training Centre

"Integrative Systems Biology – From Molecules to Life"

PhD Systems Biology

Student's Handbook

2009-2010

The University, while retaining proper regard of the interests of students who have begun their programmes, reserves the right to alter the programmes or timetables if the need arises.

1. Introduction

This Handbook is for students taking the 4-years PhD course in Systems Biology within the Doctoral Training Centre Integrative Systems Biology – From Molecules to Life (DTC ISB-ML). The DTC ISB-ML is one of three Systems Biology training centres in the United Kingdom funded by the EPSRC / BBSRC councils. The programme is run as a combination of a 1-year course with taught material and two research projects in Systems Biology, and a 3-year PhD research project. The present handbook is intended to provide detailed information on the aims and objectives, structure, and administration mainly for the first year of the course, while the rules and regulations of the years 2-4 are explained in the EPS Graduate Resource Book:

http://www.graduateeducation.eps.manchester.ac.uk/graddev/research/resbook/

The ordinances and regulations Degree of Doctor of Philosophy (PhD) can be found at:

http://www.graduateeducation.eps.manchester.ac.uk/admin/phd/

This handbook contains additional components specific for the PhD Systems Biology programme. Changes will be incorporated in updated versions that are available as a web document. Please always refer to the version found at the following webpage:

http://www.mib.manchester.ac.uk/intranet/DTC.html

Programme Structure

The first year comprises 60 credits of taught courses plus two times 30 credits of research projects, the so-called rotation projects. This prepares for the following three years of the PhD research project. Details of the taught courses and the rotation projects are given in this handbook.

Further Information

The University of Manchester Postgraduate Crucial Guide can be found at:

http://www.campus.manchester.ac.uk/studentexperi ence/pdfs/2007CrucialPG.dpf

(also available in Braille)

2. Programme Management

The programme is managed and operated in accordance with the policies, principles, regulations and procedures of the University of Manchester. The management structure of the Doctoral Training Centre aims to achieve strict internal quality control of projects, students, coaching, science and postdoctoral follow-up through the student's career. There is a clear definition of responsibilities for all personnel involved. The Management Board includes three industry members, to provide direct link to relevant industries.

The day-to-day management is handled by the DTC director and the DTC deputy director. Fundamental decisions are made by the DTC Management Board which meets regularly and also acts as the board of examiners. Administrative issues are handled by an administrator. Important members of the DTC management and administration team are given below (as of 01.05.2009):

The DTC Management Board

Chair: Prof. Nigel Vincent, Director of the Manchester Doctoral College, (nigel.vincent@manchester.ac.uk)

Dr. Gerold Baier (gerold.baier@manchester.ac.uk)
Dr. Neil Benson (neil.benson@pfizer.com)
Prof. Ray Boot-Handford (ray.boot-handford@manchester.ac.uk)
Prof. Andy Brass (andy.brass@manchester.ac.uk)
Prof. David Broomhead (david.broomhead@manchester.ac.uk)
Prof. Roy Goodacre (roy.goodacre@manchester.ac.uk)
Prof. Simon Hubbard (simon.hubbard@manchester.ac.uk)
Dr. Janette Jones (janette.jones@unilever.com)
Prof. John McCarthy (john.mccarthy@manchester.ac.uk)
Prof. Pedro Mendes (pedro.mendes@manchester.ac.uk)
Prof. Mike Sutcliffe (mike.sutcliffe@manchester.ac.uk)
Prof. Norman Paton (norman.paton@manchester.ac.uk)
Dr. Jonathan Swinton (jonathan.swinton@astrazeneca.com)
Prof. Hans Westerhoff (hans.westerhoff@manchester.ac.uk)

Additional members are the heads of postgraduate research of the Faculty of Engineering and Physical Sciences and the Faculty of Life Sciences or one of their representatives.

Contingent on the Head of the hosting School of Chemical Engineering and Analytical Sciences so desiring, a senior PG administrator of the School may attend the Board meetings as an observer.

DTC Director

Prof. Hans V. Westerhoff (hans.westerhoff@manchester.ac.uk)

DTC Deputy Director

Dr. Gerold Baier (gerold.baier@manchester.ac.uk)

DTC Experimental Officer

Dr. Maria Nardelli (maria.nardelli@manchester.ac.uk)

DTC Administrator

Lynne Davies (lynne.davies@manchester.ac.uk)

DTC PA

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3. Programme Overview

REMARKS

The teaching programme of the DTC ISB-ML is tailor made for *integration*, which is the essence of Systems Biology. The teaching curriculum is based on substantial existing experience of teaching Systems Biology at the University of Amsterdam and is also embedded in the environment of the excellent Doctoral Training Account tradition of the University of Manchester.

The teaching programme is connected to the European Systems Biology Training networks (Marie Curie NucSys, http://www.uku.fi/nucsys/), and to the network of European Systems Biology Training Centres. There is a participation of industry members on the Management Board. Additionally, parts of the course are taught by industry-related personnel.

AIMS

This Systems Biology program caters for students of diverse but relevant backgrounds, ranging from mathematics through physics, engineering and (bio)chemistry to (medical) biology. A one-year combined teaching and research programme will provide the basis for the three-years research project in a specialized topic in Systems Biology. The first year aims to prepare students in a unique way to interdisciplinary research in Systems Biology. Particularly, a combination of experimental and theoretical work will lead to a profound training that enables the student to conduct combined experimental and modelling research and to engage in informed dialogue between different disciplines. In addition to individual education, the programme focuses on the importance of productive teamwork in the context of Systems Biology research.

OBJECTIVES

The Objectives of the four-year programme are:

1. To provide a high level of fundamental knowledge in both Cell Biology and Mathematical Modelling in the context of Systems Biology.
2. To offer introductory experimental training in standard and advanced methods of cell biology, biochemistry and molecular biology.
3. To train the students in the technique of mathematical analysis and modelling of biological processes on different levels.
4. To guide the student through two extended research projects that require both experimental and theoretical approaches. She/he will thereby be trained in up-to-date methods of scientific research.
5. To enable the student to responsibly conduct a PhD thesis project on an international quality level.
6. To thereby acquire professional skills of reasoning, planning and for conducting academic and industrial research in the areas related to Systems Biology, including Biomedicine and Drug Devlopment.
7. To provide the best possible environment to finish a high-quality PhD thesis.

STRUCTURE OF UNITS OF FIRST-YEAR COURSES

Unit 0	Refreshment course in Mathematics / Biology	2 weeks	0 credits
Unit 1	Informatics and Mathematics for Systems Biology	4 weeks	15 credits
Unit 2	Systems Biology and Beyond	4 weeks	15 credits
Unit 3	Fundamental Biological Processes and Omics	4 weeks	15 credits
Unit 4	Experimental Course	3 weeks	15 credits
	FINAL EXAMINATIONS		
Exit Point 1	PgCertificate		
Unit 5	Rotation Project 1	15 weeks	60 credits
Exit Point 2 Decision	Exit point: PGDiploma EVALUATION – Progression into PhD project decided by DTC board.		Total: 120 credits
Unit 6	Rotation Project 2	15 weeks	-
	PhD project	3 years	

4. Calendar of Events for Academic Year 2009/2010

The calendar of events can be found on the webpage

http://www.mib.manchester.ac.uk/intranet/DTC.html

5. Academic Programme

First year

Refreshment courses

The first two weeks consist of refreshment courses in basics of Cell Biology and Basic Mathematics. These focus on contents that are considered prerequisite for the following courses. They are designed to equalize the level of knowledge of students with different backgrounds. At the end of the refreshment courses there will be written tests to assess the level of knowledge. The results of these tests do not contribute to the final evaluation. They are solely used to detect individual weaknesses and to design extra units of individual or small group support lessons for students with lower scores.

Additionally, there will be tutorials on Cell Biology and Maths with DTC lecturers or advanced DTC students as tutors on topics that concern all students of a cohort.

No credits are given for these courses.

Taught courses

The first part of the programme will be intensely taught courses organized in four teaching units. Each unit carries 15 credits, the total number of taught credits is 60.

Unit 0: Refresher Course in Cell Biology and Mathematics (0 Credits)

Unit 1: Informatics and Mathematics for Systems Biology (15 Credits)

- Subunit 1a: Bioinformatics, Text Mining tools and Basic Statistics (2 weeks)
- Subunit 1b: Biomathematics and mathematical modelling (2 weeks)

Unit 2: Fundamental biological processes and –omics (15 credits)

- Subunit 3a: Transcription and Translation (1 week)
- Subunit 3b: Introduction to Genomics and Functional Genomics (1 week)
- Subunit 3c: Metabolomics: physical methods for data acquisition and analysis (1 week)
- Subunit 3d: Proteomics (1 week)

Unit 3: Systems Biology and beyond (15 credits)

- Subunit 2a: Systems Biology (3 weeks)
- Subunit 2b: Beyond Systems Biology (1 week)

Unit 4: Experimental course (15 credits, 3 weeks)

DTC students are normally required to attend **all** lectures, tutorials, the experimental course and the rotation projects held in connection with the Integrative Systems Biology programme on which they are registered, exceptions will be indicated as optional for this programme. An absence from classes which is supported by medical or other appropriate information is acceptable.

Students are also expected to sit **all** weekly tests and final examinations for their degree programme and to submit **all** coursework assignments by the deadlines specified. (Exceptions are if a student is unable to do so because of illness or other good cause.)

Students who miss classes without being ill or providing some other good cause will be contacted in the first instance by DTC staff who keep a record of attendance.

The following courses of action may be taken in the case of persistent unsatisfactory attendance or unsatisfactory progress on the degree programme:

(i) the student may be interviewed by DTC staff
(ii) the student may be interviewed by the DTC director
(iii) the student may be interviewed by the Director of Graduate Studies of the School of Chemical Engineering and Analytical Sciences
(iv) the student may be interviewed by the Head of School
(v) the organisation providing funds to paying the studentship or his or her fees may be informed
(vi) the student may be required to have a record of attendance signed at each of their classes
(vii) exceptionally, the student may not be permitted to continue on his or her programme of study.

Students who miss an entire end-of-semester set of examinations without good reason will be assumed to have withdrawn.

Further information about work and attendance of students is given in Regulation XX, which is downloadable from the website:

http://www.campus.manchester.ac.uk/staffnet/policies

Apart from taught lectures the programme comprise tutorials, seminars and workshops. The method of assessment varies from unit to unit and may consist of written examinations, interviews, oral assessments, and reports (see course descriptions below). The course period contains a period for assessed written examinations for units 1-3. Written tests are applied within the units to help the student and the docents to self-assess the student´s understanding of the topics taught in the course. Failure to attend the courses without providing evidence of acceptable reasons will result in a FAIL in this course and will result in an exclusion of the programme. Further details of the courses can be found in the appendix.
If a student fails to satisfy the examiners in the final assessments or examinations of the course units are permitted to undergo a second assessment on one further occasion. Students having less than 50% in any of the examinations may be excluded from the programme by a decision of the DTC board at the end of taught courses and may not be allowed to progress into the rotation projects if the board is convinced from the performance in the examinations that the student cannot successfully complete the rotation projects. Moreover, the evaluations of all courses are taken into account for the final evaluation

of the first year when the decision is made whether a student is allowed to progress into the second year.

Rotation projects

Each student has to complete two rotation projects of 10 weeks duration (both wet and dry, where appropriate in buddy system). PIs of the MCISB and DTC will offer rotation projects which are primary research projects designed such that a student can complete them within 10 weeks. Candidates must first have satisfied examiners in the assessment of the course units before they can progress to the rotation projects. Every DTC students should keep an (electronic) lab book for the results obtained. This should be shown every two weeks to the mentor (after the 2-weekly meetings). There are fortnightly sessions where all DTC students get together and hold a work discussion, reporting to each other about their work. At the end of each rotation project each student will present her/his results in two forms: written and oral:
a) Written: in form of a poster for the first rotation project and of a research paper for the second rotation project. Structure should be: title, summary, introduction, materials and methods, results, discussion, references, appendices with all the data.
b) Oral: each student will hold a presentation about her/his part of the work. This consists of a poster presentation with oral defence for the first rotation project and a formal oral presentation for the second rotation project; the twinning students (see section on Buddying System) may divide their presentation into two parts. The audience includes the DTC students, DTC Director, DTC Deputy Director, DTC Experimental Officer and all available coaches. The presentations are assessed by the DTC Director, Deputy Director and the Experimental Officer. The final evaluation will be written and based on a report from the coach and the assessment of the presentations.

The evaluation of the rotation projects will be marked within the following categories:

Evaluation	Criteria
>70%	Research carried out and presented to a very high standard. High level of understanding of material and literature. Critical appraisal of sources
50%-70%	Clearly presented and argued research. Coherent reasoning. Good degree of understanding of the subject
40%-50% (PD Diploma)	Some understanding of subject and material presented. Adequate presentation
<40%	Little relevant material presented. Little evidence of understanding of material

Furthermore, the advice given for writing and presenting your PhD thesis (see below) apply accordingly. Most importantly, please note the clear rules regarding plagiarism and citation of sources that the University follows, and follow the guidelines published at the University website. If in doubt, the supervisor or the DTC director/deputy director should be contacted for advice. If the project is done in twinning, clearly indicate who did which part of the project.

To practise presentation to peers, a yearly meeting is organised after the first rotation project between the Manchester DTC, the Warwick Systems Biology DTC and optional participation of students from other DTCs. DTC students present a poster about their rotation project and these will be assessed by either DTC and/or MCISB staff. The reports will be made available for the DTC Management Board and can be taken into account when the continuation of the students is decided by the Board.

Requirements to progress into second year

A final decision whether a student can process into the second rotation project is made by the DTC Management Board based on the assessments of the taught units and the first rotation project. The general rule is that the student should have all final examinations passed with more than 50%, with the exception of one course that might be between 40-50%, but which needs to be compensated by at least one course passed with 50% plus the missing percentage. A failed examination of taught modules can be re-sit once. The re-sitting can be done either written or orally. A failed resit of a written examination in Mathematical Modelling can be overcome by an interview of the candidate with a course lecturer which evaluates if she/he has an understanding of mathematical concepts equivalent to more than 50 % in a written exam and is able to communicate them. Exceptions to these rules can be made in individual cases by unanimous DTC Management Board decision.

Requirements for the Award of a PG Certificate or PG Diploma after 1st year as exit point

If a student decides to leave the DTC programme after the first year, or is not allowed to progress further by the DTC board, a PG Certificate or PG Diploma is awarded based on the following criteria:

Students may be awarded a PG Certificate if they have successfully accumulated 60 credits on the basis of the taught components alone with marks of more than 50% in all taught components, with the exception of one course between 40-50% (i.e. they fail no more than 15 credits), but which needs to be compensated by at least one course passed with 50% plus the missing percentage.

To be awarded a PG Diploma a student needs to have passed the taught units and the first rotation project adding up to 120 credits. For this, she/he is required to exceed 50% in all taught assessments, with the exception of one taught course that might be between 40-50% (i.e. they fail no more than 15 credits), but which needs to be compensated by at least one taught course passed with 50% plus the missing percentage. In addition, for the Diploma, students are required to successfully complete the first rotation project assessments and achieve a mark of more than 50%.

Buddying system

Both rotation projects are expected to be done in buddying system, where two DTC students, preferably one with biological background and another with mathematical/computer science background are “twinned” and work on two interconnected projects which offer them the possibility to coach each other in the field where they are experienced. The interconnection is preferably stronger at the beginning of the projects. The DTC Director / Deputy Director monitor the design and execution of rotation projects. They observe whether the buddying system is correctly implemented. First, project outlines of the rotation projects need to specify the collaboration, how the individual contributions of the students will be assessed, and how it is made sure that the project does not fail in case that one student does not perform sufficiently. If the project proposals do not meet these standards, the DTC Director / Deputy Director will either require changes to the proposal design or reject the project proposal.

The supervisor of the rotation project will observe the individual contributions of each student from day one. Both rotation projects require from the students a bi-weekly progress report in the presence of all DTC students of that cohort, the supervisors or involved PDRAs, and at least one DTC academic

staff. As part of the progress report students informally describe the individual contributions to the project. Five weeks into the project the supervisor will consult with students and ask for feedback on whether the workload and individual contributions are perceived to be balanced and if they agree that they receive more than 40% of professional support each. In addition, the supervisor is required to evaluate whether the contribution of each student to the project exceeds 40% of the workload. Based on this the supervisor will decide whether the buddying continues to the end of the project and communicate his decision to the students. If either the students or the supervisor detect an imbalance such that students' contributions are outside the 40-60% range, the supervisor consults with the DTC Director / Deputy Director to adjust the balance for the second part of the project. If the decision is that the project should not continue as a teamwork, the supervisor consults the DTC Director / Deputy Director and together they redesign the second half of the rotation project. The second part is then planned and carried out by the supervisor such that individual assessment is possible. Progress report meetings continue as outlined above. This is implemented with individual assignments, individual progress presentations and individual writing-up of a report at the end. For the poster and oral presentation the students have to specify the individual contributions to the project supervisor. For the assessment of the oral presentation it is required that each student carries more than 40% of the workload. Failure to do so, will lead to unequal markings of the students.

2nd to 4th year

Research project (2nd to 4th year)

Proposals for potential research projects will be collected by the DTC administrator during the first year. There will be a call for proposals to academic staff from FEPS, FLS and the Medical Schools of FMHS. Students are informed that they can participate in the elaboration of a PhD research project together with any of the academic staff included in the call. A research project typically should:

- be from within Systems Biology (defined as discovery of how biological function arises from interacting components of biological systems)
- be collaborative between a group in the MCISB (or MIB) and a well-established Systems Biology group outside the UK, or in an affiliated industry (AstraZeneca, Unilever, Pfizer)
- consist of an experimental part plus a theoretical part, with at least 15% of both
- be structured according the guidelines of the proposing Faculties and the DTC
- be doable in 2.6 years, leaving the rest for thesis writing.
- Have the potential to produce one publications per student per year.

Procedure for the Assignment of PhD Systems Biology research projects

1. Call to PIs from FEPS, FLS, FMHS (medical schools) to submit proposals to DTC

2. Review of received proposals by Hans Westerhoff and Gerold Baier – proposals are forwarded to DTC Management Board with comments and recommendations

3. Discussion and Approval/Rejection of projects by DTC Management Board

4. PIs of rejected proposals are given feedback and opportunity to revise the proposals. Resubmission to DTC (Hans Westerhoff)

5. Decision on revised proposals by DTC (Hans Westerhoff and Gerold Baier) communicated to DTC Management Board

6. Distribution of approved PhD projects to first year students. Students are asked to review the proposals, contact PIs of projects they are interested in and prioritise the their interests. DTC invites PIs of proposals to present their projects to the DTC students.

7. Students communicate a list of 3 projects in the order of priority to the DTC (Maria Nardelli).

8. Assignment:

Where top priority projects are chosen by only one student students and supervisor(s) are asked to agree on the start of the project.

If more than one student lists the same process as top priority, the DTC starts discussions whether the second priority or third priority is a viable option for the students and there by resolve the conflict.

If two students insist on their top priority, the DTC discusses with supervisors of the proposal whether more than one student can be accepted on projects that are related but sufficiently independent to warrant the award of a PhD.

If no solution can be found with the supervisor(s) of the project, the DTC first advises the students to reconsider the list of approved projects and in discuss with supervisor(s) whether adjustment can be made to address the student's interests.

If not successful, the DTC suggests a number of alternative PIs that can be contacted by the students to ask for new alternative projects along their lines of interest. The DTC supports alternative supervisor(s) to shape a project that is in accordance with the DTC guidelines for project proposals. If an acceptable proposal is received and student and supervisor(s) agree on that project the project is assigned to that student and the case resolved.

If no agreement can be found the case is reported to the members of the DTC Management Board for final decision.

Suggested **schedule** for the above steps (dates refer to the taught year of the programme):

Call for PhD project proposals sent to PIs:	by 31. January
Deadline for submission of PhD project proposals:	28. February
Assessment of projects:	Board meeting in March/April
Deadline for submission of revised proposals:	30. April
Distribution of proposals to students:	31. May
Presentation of proposals by PIs:	July
Deadline for assignment of PhD project:	31. August

Each project will have a supervisor and one or more co-supervisors, plus an "advisor". The latter should usually have some distance for the project and serve as mentor during this phase of the programme. Wherever there is no supervisor or co-supervisor from the DTC board, the students will be assigned to a board member as advisor.
During the first two months the student will produce (together with the supervisor) an outline of the research project which details the planned projects and potential chapters of the thesis / papers. These shall contain milestones with months assigned which will be used to monitor progression. This plan will be constantly updated and will be shown every two month to the supervisor and DTC director.

Every two months all DTC students of one cohort will meet and report informally on their projects and discuss scientific problems. Twice a year, a formal presentation on the project will be given to assess process, which will serve as a report for monitoring progress and aids the DTC board to decide on progression into third and fourth year.

Exit from the programme during the PhD research project

If a student leaves the programme during the research project in years 2 to 4 she/he is entitled to ask for the PG Diploma as an exit degree. A possibility to exit with a Master's degree exists only if: (1) the student has passed successfully into year 2 (i.e. no more than 15 failed but compensated credits from the first year); (2) the student has sufficient experimental or theoretical results to write a thesis (this is judged, based on detailed reports of all supervisors, by the DTC Management Board upon the student's request); and (3) the student then completes a thesis that passes criteria for a Master's thesis within the University rules and regulations. This thesis is then awarded 60 credits yielding a maximum total of 180 credits for an exit with a Master's degree.

6. Research Thesis

The production of a PhD thesis is almost certainly the largest single academic and literary task you will have attempted. Few students realise how much effort goes into the production of a worthy thesis. A typical timescale is about four to six months. There are varying attitudes by both supervisors and students to reading and commenting on drafts of theses. This depends largely on the individuals concerned, but it is important to agree on the procedure early on to avoid misunderstanding. The importance of clear writing in good English cannot be overstressed. It is worthwhile looking at a few examples of recent theses before starting to plan your own thesis. The reader should be assumed to be a system biologist in your field of research, although not an expert in the particular work described. The most useful recommendation is to make your thesis tell a good story; do not flip haphazardly from subject to subject, and keep your best results and conclusions to the end. It is well worthwhile having a colleague read your final draft to weed spelling, grammar and punctuation mistakes out. The University and Faculty have strict regulations regarding the format of theses. Make sure that you conform to them. Here are some general points:

Presentation should be of a high standard with no spelling, typographical, grammatical or punctuation errors. Tenses should be consistent and appropriate. Notation should be consistent. There must be sensible numbering of equations, tables, figures, references and other items. Jargon must be avoided. Graphs must have sensible scales and labelled axes.

The thesis should include a description of relevant background material and literature, including theory and experimental equipment, to enable the reader to understand the research, and to demonstrate the author's understanding. This description should not be a mere list, but show evidence of critical judgement, e.g. by explaining why certain choices were made. The main reason for the thesis is to demonstrate and document the author's actual work and contributions to the research undertaken. Hence the amount of background which is given should not be excessive; 20-30% of the thesis is normally regarded as a reasonable proportion.

It is important that the work be described in sufficient detail so that another researcher could confidently repeat it. Most importantly, the reader must be able to assess the reliability of the conclusions, i.e., the author must convince the reader that the results can be justified and should be believed. The thesis material should be set in the context of current research; other relevant work must be cited, and if appropriate compared to that which has been undertaken. Ideally, the content of a thesis should be suitable and ready for publication and this should be the goal. However it is realised that this may not always be possible in the time available. At the very least it should be straightforward for the supervisor, or some other colleague, to bring your work to the stage for publication.

Supervisory arrangement

Each student should have:

- Two supervisors – one for the experimental component and one for the theoretical component of the PhD research project. Additional supervision may be agreed upon if required. One of the supervisors is named principal supervisor. The Faculty/School of the principal supervisor will in general also be the Faculty/School in which the student is inscribed. One of the supervisors can be external to the University of Manchester. The supervisors agree on the percentage of supervision for each of them and communicate this division of labor to the corresponding PG office.

- One progress examiner for the first and second year progression of the student.

- One internal and one external examiner for the Viva – to be named when the thesis is submitted.

- One advisor. The role of the advisor is pastoral care and a point of contact for issues related to supervision, progression etc. The advisor is not necessarily associated with the DTC-ISBML and should, if possible, not be involved in the research project.

The main supervisor is responsible that the supervisory arrangement is in place and that the names and their respective roles are communicated to the DTC student, the DTC and the PG office.

For confidential advice on all matters relating to the PhD project or any matter related to postgraduate studies students may contact the Academic Advisory Service at:
http://www.campus.manchester.ac.uk/academicadvisoryservice/

First Year Progression policy

A progression decision is made at the end of the first year of the research project (at the end of second year of the PhD).

1. In order to progress into the second year of their research project (third year of the PhD programme) a student must fulfil the requirements for 1st year progression as outlined in the EPS Graduate Resource Book.
2. The student is required to prepare a written report on the research carried out in the first year of her/his project. The student has to agree with the supervisor(s) and the internal examiner on the form and content of the report.
3. The student is responsible to hand in the written report to supervisor(s) and internal examiner at least one week prior to the oral presentation or viva.
4. The student has to arrange a date for the oral presentation before the end of the first year on the research project.
5. The oral presentation can only take place if (all) supervisor(s) and the internal examiner are present. The DTC encourages the supervisors to allow the postdoctoral research fellows who are directly linked with the project to be present as well.
6. The viva consists of a presentation of the student that includes Background, Problem, Relevant literature, Methodology, Results, Critical Discussion of Results, and Outlook of work to be done in the second year of the project. The length of the presentation can be agreed with the supervisor(s) and internal examiner but should not exceed 30 minutes.
7. After the talk the content and the form of the presentation are open for discussion by supervisor(s) and internal examiner. The discussion is particularly meant to detect weaknesses in the planning, performance, or progression of the project.
8. Students need to fill out page 1 of the first year progression form, supervisor(s) and internal examiner fill out and sign the remaining 6 pages.
9. The filled out and signed form needs to be handed to the SCEAS PG office, a copy must be handed to the DTC administrator Lynne Davies.
10. The DTC receives an electronic version of the written report.

Plagiarism

Plagiarism is the unreferenced use of other author's material in your assignments and thesis. If you reference other people's work it must be acknowledged clearly. The University's regulations state very clearly that plagiarism is a serious academic offence and the consequences of committing such an offence are severe. All students should read the guidance notes on plagiarism and academic malpractice which is available at: http://www.manchester.ac.uk/policies/. If you are in any doubt you must seek guidance from your supervisor.

7. PhD Thesis Submission

A student's PhD thesis must be presented in accord with the FEPS Faculty guidelines. For EPS registered students the submission process is as follows:

- 6 weeks prior to actual submission the student completes a Notice of Submission and presents to Faculty Graduate Education office.
- This will generate an email-form to the supervisor(s) who will nominate 2 x examiners (1 x internal and 1 x external).
- The completed form is sent to the responsible School's PG director, who countersigns and in turn forwards the form to the Faculty Graduate Education Office.
- The student submits 2 x soft bounds copies of the thesis to the Faculty Graduate Education Office and an electronic pdf version to the UoM Institutional Repository which is then sent with the official examiner forms and guidelines to both examiners.
- Both examiners at this point receive an automatically generated email to inform them that the thesis is about to be despatched.
- The internal examiner then co-ordinates the process to facilitate the **Viva** notifying the student of the time and UoM venue. The student can ask for anyone except the examiners to be prohibited from attending.
- Faculty Graduate Education Office receives the completed examiners report with the recommendation.
- Faculty PGR Panel ratify the result.
- Faculty Graduate Education Office notify the student of the result.
- If passed student supplies 2 x hard copies of the thesis plus a further corrected electronic pdf version into the Institutional Repository.
- If passed Faculty Graduate Education Office activate the student's graduation record for the student to register for graduation.

For a re-submission the process repeats.

A PhD thesis must be submittted within the four year funded programme and there is no additional submission pending period. Only under exceptional circumstances, the degree may be extended beyond the four years permitted.

For the ordinances and regulations concerning the Doctor of Philosophy (PhD) please see:
http://www.campus.manchester.ac.uk/medialibrary/researchoffice/graduateeducation/reg-phd.pdf

A Guidance for the Presentation of Theses is available at:
http://www.campus.manchester.ac.uk/medialibrary/researchoffice/graduateeducation/g-pres-theses-pgr.pdf

For updated rules concerning permission to extend the thesis submission deadline see:
http://www.graduateeducation.eps.manchester.ac.uk/admin/phd/

8. Progress Monitoring and QA Procedures

As a student in the Faculty of Engineering and Physical Sciences you are bound by a set of regulations and policies that cover your conduct, the rules of your degree and other important information. These Regulations and Policies are available for download from this Student Intranet:

http://www.eps.manchester.ac.uk/servicesandresources/graduateschool/studentintranet/regulationspolicies/

During the programme the progress and quality of the course is monitored and documented. The following procedures should ensure the high quality of the programme, and help the students to make sure that exams, results of examinations, student's reports, and questionnaires are stored and documented.

Examinations

After each course, a test takes place for self-assessment (which is not the final assessment). At the end of the taught courses, written examinations will be held. Also, other assessments might take place during the course, as specified in the course description. Each exam is marked by two persons, the teacher and an adequate academic nominated by DTC Director or Deputy Director.

Regular reports

During the 2nd-4th year, students have to report their progress regularly (at least half-yearly, orally) to the DTC Director or other members of the DTC committee to ensure that problems in the project are identified early. Supervisors join these presentations. DTC may organize regular seminars in which the reports may be held.

Advisor system

All students are assigned an Advisor who is not directly involved in the research project but can be approached for conflicts with the supervisor(s) and for pastoral consultation.

Evaluation forms

Evaluation forms are given to both students and lecturers/tutors after each course. Both students and teachers must complete these forms. The forms for students are divided into an anonymous one and one form containing the name of the student to ensure that criticism can be made anonymously. Questionnaires are collected and made available to the DTC committee and to the school after each teaching period.

Complaint procedures

The DTC, the School and the University take the well-being of their students very seriously. Students who have cause for concern are asked to speak to their supervisor, teacher or mentor in the first instance. The more information the student can provide the more effective this discussion is likely to be. Alternatively, a student may seek advice from the Academic Advisory Service (tel:0161 275 3033; email: cass@manchester.ac.uk), or the Students´ Union Advice Centre (0161 306 4007 or 0161 275 2858; http://www.umsu.manchester.ac.uk/advice/).

Complaints about taught courses, marking, and grading should made promptly and, whenever possible, directly to the teacher involved or the mentor. If this is not appropriate, the following route should be taken: In the event that a student wishes to appeal against a mark, grading or a decision on progression, it is important that the appeal is made to the DTC Director in writing as soon as possible. A copy of any supporting documentation (not the original) should be supplied. The DTC committee undertakes to promptly consider and deal with appeals on the grounds of bias, prejudice or inadequate assessments as set out in the University Regulations. The decision on the appeal will be notified to the student by the supervisor or DTC Director. Thereafter, if the student wishes to take the matter further, the supervisor will refer the circumstances to the Director of Postgraduate Studies and the Head of School who may deal with the matter within the School or advise the student to contact the Faculty. Details of the EPS Faculty appeals procedure and information on the process and regulations of formal appeals that the university has established can be obtained from:

http://www.eps.manchester.ac.uk/servicesandresources/graduateschool/studentintranet/regulationspolicies/generalregulations/

9. Student Responsibilities

Personal Details
The DTC should be notified, via the administrator, of any changes of address or personal circumstances. The administrator and the supervisor should also be informed of any illnesses or other circumstances which might affect a student's attendance or work.

Attendance
It is crucial that postgraduate students attend regularly and maintain a continuous dialogue with their supervisors. Attendance at the courses is a requirement. Be there in time. As well as securing the appropriate grade by assessment, it is also a formal requirement that the students earn the relevant number of credits. Credits are obtained by attending courses, through private study, by being assessed, by project work and by other group related activities such as attending seminars. Failure to attend the courses means a failure to obtain a sufficient number of credits to progress to the award of degree. For those students receiving financial support, it should be noted that the supervisor and Director may be required to sign a certificate of satisfactory attendance and work in order for payments to continue. Students are also expected to attend School and group seminars and workshops that are relevant to their research interests. They are encouraged to attend other seminars as part of their general scientific education.
The timing of holidays and other time away from the University must be discussed with, and agreed by, the DTC director / deputy director (year 1) or your supervisor (years 2-4).

10. Personal Development

Courses on scientific skills, networking and communication (2nd to 4th year)

Additionally to the University skills training students will take part in 3 workshops lasting 2-4 days organised by Imperial College (subject to the availability of sufficient funding). The course contents are summarised below:

- **Teamwork Training Course:**

An intensive course in teamwork, personal development, information gathering and presentation. Underlying the skills training is a networking and relationship-building ethos whereby working relationships between the PhD students within the Doctoral Training Centre, as well as the other various EPSRC-funded DTCs in the UK, are fostered and encouraged. Bespoke course elements, specifically a business game centred on a biotechnology start-up company and a presentation exercise based on a research grant pitch around the subject area of "What's in a cell?", ensure that the course maintains a level of subject-specific focus.

- **Science Communication Course:**

The course is an intensive two and a half day residential course directed by Gareth Mitchell, lecturer in Broadcast Communication (Radio), in the Science Communication Group at Imperial College, and also an experienced and practising scientific broadcaster for the BBC. The course was designed so that all of the students learned and practised skills on both sides of the camera and microphone as well as gaining skills in plain effective scientific writing under real time pressure.

- **Decision Making and Leadership Course:**

This course provides the methodology and analysis of decision making, much of which follows from models used in the teamwork course. It includes content specific to the pharmaceutical industry such as an exercise in selecting a target "health need" candidate area for presentation to a "board" and a drug production process scale up simulation. These exercises prepare the students towards the needs of pharmaceutical companies and the wider industry, potential employers of our students. Decision making is further contextualised with career choice and thesis completion planning. As Ph.D. level graduates it is likely that many will go on to senior positions and this course begins the process of developing leadership aspirations and styles amongst participants; good decision making being one of the key elements of leadership.

The Graduate Development programme runs a wide range of courses which are available to postgraduate students. Students are required to attend the introductory programme. Details of the timetabling of these will be available during faculty induction.

The course usually covers topics such as: Managing Your Research Project, Team working, Presenting to Different Audiences, Presentation Skills for those whose 1st language is not English, Finding a Job in the UK, Finding a Job Overseas, Applying for Jobs - CVs and Applications.

Furthermore, the faculty holds training workshops that are tailored to particular stages within a three years PhD programme. All workshops are repeated in multiple sessions throughout the year. We encourage students to attend these workshops during years 2-4 in the DTC programme. They include:

Year 1: Speed PhD Introduction to Research (compulsory)

Academic Writing (Nov / Feb / May)

Effective Presentations (Nov / Feb / May)

Creating Ideas (Apr)

Year 2: Developing the Postgraduate Manager (Mar / Jun)

Planning the Final Year (Nov / Feb / May)

Academic Paper Publication (Nov / Feb / May)

Networking (Apr)

Year 3: Career Management / PhD Options (Mar / Jun)

Teaching in Higher Education (Nov / Feb / May)

Starting a Business (Feb / May)

Information on the graduate development programme of the Faculty of Engineering and Physical Sciences is available at:

http://www.eps.manchester.ac.uk/servicesandresources/graduateschool/studentintranet/graduatedevelopment/