

# School of Chemistry

## Post-Graduate Research

### Handbook

#### **Graduate Research Committee (GRC) for all PGR in chemistry**

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## 1. Introduction

The primary purpose of this handbook is to inform post-graduate students and supervisors of the expectations and procedures for the postgraduate research programme in the School of Chemistry at NUI Galway.

In this regard, the handbook primarily describes a number of procedures and timelines for monitoring progress of postgraduate students on structured MSc and PhD programmes. The Handbook also describes the responsibilities of supervisors, students and members of the Graduate Research Committee.

The handbook serves to present local guidance relating to the postgraduate research programmes within the School of Chemistry and College of Science. All students should be familiar with the broader University Guidelines & Regulations for Research Degree Programmes to which we are bound. These guidelines are available on the Graduate Studies Website:

[http://www.nuigalway.ie/media/graduatestudies/files/university\\_guidelines\\_for\\_research\\_degree\\_programmes.pdf](http://www.nuigalway.ie/media/graduatestudies/files/university_guidelines_for_research_degree_programmes.pdf)

And also recommendations from the college of science are found at this link:

<http://www.nuigalway.ie/science/postgraduatestructuredprogrammes/structurephdguidelines/>

## 2. Responsibilities

### The Postgraduate Student

You are the main person in the Postgraduate Programme and the programme is designed to help you in the successful completion of a postgraduate degree. The postgraduate research student is responsible for carrying out postgraduate research which is quite different from an undergraduate degree. A major difference is that you will often be expected to work on your own and take the responsibility for your work. To ensure success in achieving a postgraduate degree, you will need to be highly motivated, and a team player. Experience has shown that research students **typically have to invest a significant amount of time, over and above that of a "normal" working week**, to achieve the goals of their research. Days off should be discussed with the supervisor.

The postgraduate student is responsible for:

- Communicating regularly with your supervisor (i.e. report progress, barriers to progress and problems) and any other persons as appropriate. If you have a problem or wish to discuss an issue, do not wait until your supervisor sees you, but actively seek out your supervisor to arrange a meeting at a mutually convenient time. As a rough guideline, you should see your supervisor at least once per week, albeit for a short discussion.
- Carrying out any appraisal of safety issues in your experimental work, in consultation with your supervisor.
- Maintaining a record of your research using a lab-book or its electronic equivalent. The responsibility for backing up data lies entirely with you and it is essential that your results, if stored in electronic form, are backed up regularly.
- Completing two core and four elective modules as part of your structured PhD. In consultation with your supervisor/GRC, pick modules that will assist your research and reward / support other transferrable skills during your study.
- Submitting their GS030 form or Annual Student Report to GRC..  
<https://www.nuigalway.ie/graduate-studies/currentstudents/guidelines-regulations-forms/relevantofficialformsforstudents/>
- Attending conferences in your research field with a minimum of two in your 4-year PhD including one outside the island of Ireland.
- All data (electronic and paper copies, as well as lab books) need to be handed over to the supervisor at the end of the graduate programme.
- Writing articles for peer-reviewed journals in your research field. The number of articles depends on the subject area and nature of your research, but a reasonable goal is a minimum of 1 peer reviewed paper accepted as a first author in a journal with an impact factor of at least 1.
- Submitting your thesis in a timely manner. Your goal should be to complete your PhD research in four years and one year for an MSc by research.
- Defending your thesis in a *viva* through an oral presentation of your research work and the answers to the questions of at least two independent examiners.

### **The Supervisor**

See university guidelines section 3.3:

[http://www.nuigalway.ie/media/graduatestudies/files/university\\_guidelines\\_for\\_research\\_degree\\_programmes.pdf](http://www.nuigalway.ie/media/graduatestudies/files/university_guidelines_for_research_degree_programmes.pdf)

Each student will be assigned a primary supervisor, and possibly a co-supervisor where this is appropriate. The primary responsibility of the supervisor is to provide guidance on the student's research. As additional local guidelines, the responsibilities of the supervisor include:

- Providing (in consultation with the School) suitable office space, laboratory space and adequate equipment for the research;
  - Providing safety induction to work in the laboratories of the school of chemistry and answering all safety concerns that can arise during the post-graduate studies;
  - Ensuring that the student has been introduced to members of their research group and are familiar with university facilities such as the Library and Information Systems & Solutions (ISS);
  - Providing advice and guidance about the direction of the research and the strategies that might be used to achieve the goals of the research. This also includes advising the student on the research modules to be chosen in any given year;
  - Providing guidance on the standard of work expected for a PhD or MSc Research, and communicating clearly to the student when that standard is not being met;
  - Ensuring there is regular contact with the student, **typically at least once a week**;
  - Providing timely feedback on written reports and oral presentations where appropriate;
  - Providing the opportunity for students to attend international conferences in their specialist subject;
  - Providing encouragement to write papers for peer-reviewed journals. In this regard, the supervisor should ensure that the student is given appropriate recognition, for example as first author where appropriate.
  - Ensuring a timeline of 4 years for a fulltime PhD Research.
  - Ensuring that the research is carried out to the highest ethical standards, and to assist the student to get approval from the NUIG Research Ethics Committee where appropriate.
  - Ensuring that adequate supervision is in place for students during any extended period of absence of the supervisor.
  - Reporting on the progress to the students Graduate Research Committee prior to the GRC meeting each year (using the GS040 form).
- <https://www.nuigalway.ie/graduate-studies/currentstudents/guidelines-regulations-forms/relevantofficialformsforstudents/>
- Assessing and relaying the outcome/result of student assignments performed in GS modules for which the supervisor is the responsible person.
  - Organizing the arrangements for the examination (Section 6.3 of the university guidelines).

- Inspecting and approving the final soft bound copy of the thesis for examination as referred to form EOG-020.

## GRC

Graduate Research Committees (GRCs) are integral to delivering quality graduate education at the School of Chemistry. The committee consists of three members of academic staff, which may include an external member from another university. A supervisor may not be a member of the student's Graduate Research Committee. Membership of the GRC does not preclude you from also being an internal examiner for the same student. In the case of supervisors who have not yet supervised a PhD to successful completion, the Graduate Research Committee should include an experienced supervisor. This committee will track student progression through the degree.

The GRC responsibilities are:

- Ensuring that the quality of postgraduate programme reaches the highest standards in comparison with other universities internationally;
- Attending student presentations for first, and third year students;
- Giving feedback to the draft of a publication for 2<sup>nd</sup> year students;
- Signing off on the GS050 progress form and returning it to the Administrator in the School for PGR programmes;

<https://www.nuigalway.ie/graduate-studies/currentstudents/guidelines-regulations-forms/relevantofficialformsforstudents/>

- Meeting with students to discuss progress annually and during the course of the research degree;
- Providing feedback to students and supervisors after the annual meeting;
- As per form EOG-020:
  1. approving for examination the final draft of the PhD/MD thesis of title above
  2. for candidates in structured research programmes, confirming that the minimum requirements for the taught modules under the Structured PhD/MD, as required by College, have been successfully completed by the candidate.

### It is the responsibility of the Chair of the GRC to:

- Ensure that feedback from the annual review is given to the student & supervisor. The Chair of the GRC will send the feedback by email to the student, with a copy to the GRC members and supervisor.
- Raise any matters of concern to the supervisor or and, where appropriate, the Head of School.

Failure to do so will be communicated to the College of Science and could prevent the student from registering for the next year of study.

**The Head of School is responsible for:**

- Appointment of the Graduate Research Committee members and Chair.
- Managing the allocation of space and resources throughout the School.

**The College of Science is responsible for:**

- Convening an examination board meeting that considers any recommendation made by the GRC, for each PhD student, from one year to the next.

**Referring to section 2.3 of the university guidelines: “...The Dean of Graduate Studies, acting with the Secretary for Academic Affairs and the Standing Committee of Academic Council, is responsible for the overall management of the operation of University postgraduate research programmes”**

### 3. Module Registration

Each year students are requested by the University to formally register online for their postgraduate programme (<http://www.nuigalway.ie/reg/>). In this process the student selects modules, in consultation with their supervisor. Only modules which students are confident that they will complete for credit i.e. ECTS in the academic year should be chosen. The research component in the appropriate discipline, CH650 for chemistry, accounts for the remaining credits, bringing the total credits up to 90 ECTS.

The typical steps in the registration process are as follows:

- Discuss choices of modules with supervisor;
- Go to Registration web page & log in and work through the menu on left;
- Choose the most appropriate modules and only include modules that will be completed in the current academic year;
- Add research component to bring credits up to 90 ECTS for academic year. i.e. if 3 modules each 5 ECTS are chosen, the research component of 75 credits needs to be selected (RM075 + CH650 Chemistry + other modules to value of 15 ECTS”).

In principle, students can elect to take PG modules from across the College of Science. If they wish to take any undergraduate modules, then this has to be approved by the Graduate Studies committee of the College of Science. The criteria for acceptance are that (i) the module will assist the student’s



research, (ii) the student has not taken a similar module previously and (iii) the Supervisor and Module Owners agree to the student taking the module.

Postgraduate students typically join the School in September and shortly after starting they will have a School induction, at which the Postgraduate Programme as well as other aspects of the School, such as Health and Safety considerations, will be explained in some detail. A tour of all the labs in the School will be organised by *An Cumann Ceimice*, the Chemistry Society, who will also organise a social function to coincide with the induction to which all postgraduate students and supervisors are invited.

#### 4. Research and Structured MSc in Chemistry

The Structured Master in the School of Chemistry contains taught modules (30 credits) in addition to the research component (60 credits) and runs from September to August. The taught modules are scheduled for the first three months (with two exam papers at the beginning of December), while from January to August the student works full-time on their research project. The taught modules comprise two mandatory core modules of 25 ECTS (**CH5102** and **CH5103**) and a 5 ECTS elective module.

	ECTS	Code	Responsible
<b>Core Modules</b>			
Chemical Research and Problem Solving	10	CH5103	Andrea E.
Techniques and Skills for Chemistry Research	15	CH5102	Pau F.
<b>Elective Modules in Chemistry</b>			
Carbohydrate Chemistry	5	CH503	Paul M.
Advanced Radical Chemistry	5	CH504	
Combustion Chemistry and Kinetics	5	CH507	Henry C.
Problem Solving in Chemistry	5	CH509	Patrick O.L.
Process in Pharmaceutical Industry	5	CH510	Eddie M.
<b>Elective GS modules</b>			
<a href="https://www.nuigalway.ie/graduate-studies/currentstudents/gsmodes/gsmodes/">https://www.nuigalway.ie/graduate-studies/currentstudents/gsmodes/gsmodes/</a>			

The student submits a soft-bound copy of their thesis before the end of August to the Exams Office (see <http://www.nuigalway.ie/exams/thesissubmission/> for the deadline). The thesis is evaluated by an external and an internal examiner who is not the supervisor. Usually there is no *viva*. Reference 8.4 of the university guidelines: “If a *viva* is required (either because it is normal practice in a particular discipline area, or because it is requested specifically by the examiners) it is organised like the oral examination for a PhD degree (see Section 6.4), but normally would be significantly shorter.” MSc students will be provided with a separate MSc booklet at the start of term outlining information on the timetable, deadlines, written exams, continuous assessment and assignment and module assessment

For the Research Master the student will only perform research work in the laboratory and the thesis will be assessed by both external and internal examiners. See the link below for more information:

[http://www.nuigalway.ie/media/graduatestudies/files/university\\_guidelines\\_for\\_research\\_degree\\_programmes.pdf](http://www.nuigalway.ie/media/graduatestudies/files/university_guidelines_for_research_degree_programmes.pdf)

And refer to section 8.3 of the university guidelines. For transfer between Research Master and PhD Degree (Section 5.8.4): Based on the Yearly Progress Report (see Section 5.8.3 above), your GRC may recommend to the College that you transfer from a research Master's Degree to a PhD. A recommendation from the GRC is required before the College can consider a transfer application by any student.

## 5. Structured PhD in Chemistry (1SPS1-CH650)

In addition to the research component, graduate students will be required to successfully complete a minimum number of approved modules consisting of 30 ECTS over the course of the PG studies. Students participating in the structured PhD programme in the School of Chemistry at NUI Galway will take two core modules in Teaching and Learning (**GS506**) and Graduate Research Skills (**CH506**) as outlined below. They should register for GS506 only once (preferably for third year) and should preferably take CH506 in their first year. Students are free to choose four elective modules, based on generic / transferrable skills or in discipline-specific courses in consultation with their supervisor.

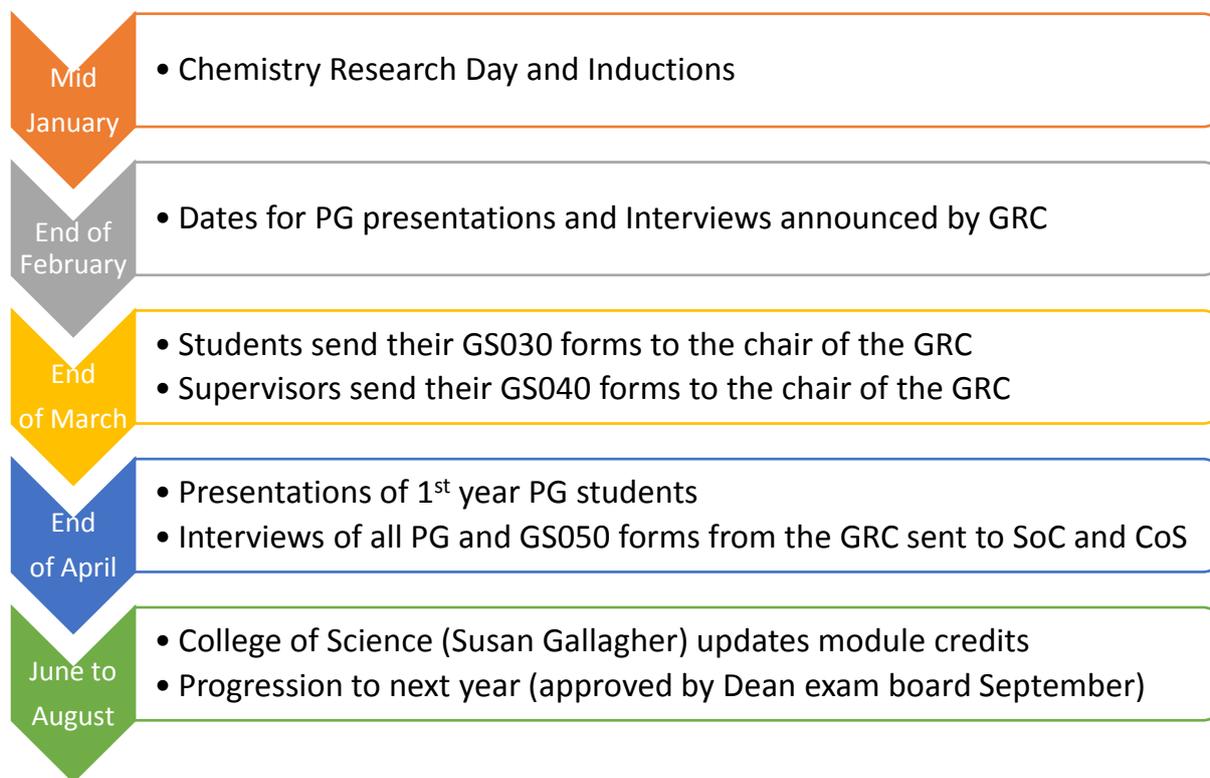
A summary of the modules for the structured PhD in Chemistry is given as follows and we highly recommend to select **the two following modules**:

- **GS526** Oral/Poster communication, 5 ECTS in years 1-3 of your PhD
- **GS515** Research Paper Publication, 5 ECTS

	ECTS	Code	Responsible
<b>Core Modules</b>			
Teaching and Learning	5	GS506	CELT
Core Skills for Chemistry Research	5	CH506	Pau F.
<b>Elective Modules in Chemistry</b>			
Carbohydrate Chemistry	5	CH503	Paul M.
Advanced Radical Chemistry	5	CH504	
Combustion Chemistry and Kinetics	5	CH507	Henry C.
Problem Solving in Chemistry	5	CH509	Patrick O.L.
Process in Pharmaceutical Industry	5	CH510	Eddie M.
<b>Elective GS modules</b>			
<a href="https://www.nuigalway.ie/graduate-studies/currentstudents/gsmdules/gsmdules/">https://www.nuigalway.ie/graduate-studies/currentstudents/gsmdules/gsmdules/</a>			

## 6. Progress of the PG in chemistry

Each academic year, the progression of the PG will have to follow the workflow below:



Along with the yearly interviews and forms, students will need to comply with the following:

- Year 1 (end of April): A short presentation of 10 min plus 5 min of questions will be given to the school of chemistry.
- Year 2: (mid-April): the PGR will write a draft of a publication (minimum 4 pages) and send it to the chair of the GRC before 15<sup>th</sup> April. This draft publication will be reviewed by the GRC member of the section (inorganic, organic or physical).
- Year 3: (mid-January): a presentation will be given (15 min+5 min of question) to the school of chemistry during the Chemistry Research Day with a slide detailing the action plan towards completion of the PhD.
- Year 4: we recommend one participation at a conference outside the island of Ireland and one publication as first author accepted in a journal with IF > 1 before submission of your thesis and approval by the GRC member.

Meetings could be organized between GRC members and supervisors in May to discuss progress/issues for each of their PGRs.

**Exceptionally, the programme can be extended for normally no more than a 5<sup>th</sup> year after meeting of both the student and the supervisor with the GRC for justification. Candidates whose theses**

have not been approved for examination within the due period from the date of registration must re-apply to the relevant College setting out justification for the requested extension of the allowed time period.

The pass level in Chemistry modules will generally be a 40% in line with University marks and standards.

## 7. Procedure in the case of concern about PGR progress

If the GRC has significant concerns about the progress of a student, going beyond the usual level of recommendations and feedback, then it should adhere to the following procedure:

1. As referred in 5.8.3 of the university guidelines: “Research students past their time limit (i.e. after 4 years for a full-time PhD, 6 year part-time PhD, after 2 years for full-time Masters and 3 years part-time Research Masters students) should meet more frequently with their GRC e.g. quarterly. The completion plan is to be the focus of GRC meetings in the final year and any years over the time limit. The GRC will indicate “Continue but further review necessary “ in the GS050 form sent to the CoS. It will also draw up a list of actions and a plan for implementation, including a date for an extra GRC meeting to review progress.
2. The chair of the GRC will send the action plan to the other members of the GRC, the student’s supervisor and the Head of School during the month following the yearly annual meeting.
3. The chair of the GRC will convene a meeting with the student and the GRC to re-review progress.
4. The chair informs the student’s supervisor, the School administrator, and the Head of School if the action plan has been satisfied.
6. If problems persist, the chair of the GRC will arrange a meeting with the GRC, HoS and supervisor to discuss further actions.

## 8. Submission of the thesis

PhD theses can be submitted in monograph or article-based formats. Recommendations are made in section 6.2.3 of the university guidelines for the format and also herein:

<https://www.nuigalway.ie/media/graduatestudies/files/writingascientificstylethesis/Writing-a-Scientific-Thesis.pdf>

For a PhD written in an article-based format, the University regulations state in section 6.2.6:

“In this (article based) format, a number of research articles written by the student while registered for the PhD, either published or accepted for publication, are presented with an introductory chapter, explanation of the research question, relevant literature and methodology and a concluding chapter.”

The School of Chemistry requires:

- Three peer-reviewed research articles, published or accepted for publication.

- The student must have made a major contribution to the work described in each article and the writing of the article. This contribution must be clearly described in the thesis document.
- The articles presented in the thesis must be supported by a comprehensive introduction, methodology, and conclusion.

Students who do not satisfy these requirements can submit their thesis in the usual monograph style.

When submitting a soft bound thesis for examination, the thesis must be approved for examination according to the University Guidelines.

- An EOG 020 form should be presented with the thesis when seeking approval for examination.
- An EOG051 form will be submitted together with the hard-bound PhD/MD thesis to the library.

<https://www.nuigalway.ie/graduate-studies/currentstudents/guidelines-regulations-forms/relevantofficialformsforstudents/>

## 9. *Viva voce* and award of the MSc or PhD in Chemistry

The University requires a *Viva Voce* examination (See section 6.4 of the guidelines) to be carried out for all students undertaking the PhD degree. This oral examination follows an examination of the soft bound thesis by the external and internal examiners that will be chosen following the university guidelines section 6.3.2 Approval of Examiners. The examiners are approved by the GRC, Head of School, Dean of College and exceptionally Academic Standing committee.

External examiners: “ should normally be appointed from outside the Republic of Ireland. Because of the University’s alliance with the University of Limerick the external examiner shall not be drawn from the University of Limerick, except with the approval of Standing Committee, under clearly defined and exceptional circumstances, where the expertise required cannot readily be found elsewhere ...”

Internal Examiners: “...As a general principle, neither Emeritus nor Adjunct Professors should act as an internal examiner. However, it was agreed that a College could make a recommendation to the Standing Committee for exceptions to the principle on a case by case basis, such a recommendation to be made in good time so that the Standing Committee would be in a position to give the recommendation”

<https://www.nuigalway.ie/exams/staff-invigiators-external/external-examiners/>

Following section 6.3.4 and 6.3.5: “A chair of the *viva* must be nominated, and approved by the College, for each PhD examination and must be present at the *viva*. The chair will normally be the

Established Professor of the relevant discipline. However, he/she may nominate another permanent member of academic staff in the discipline to act as chair”

About 2 to 3 months before the *viva*, the student will submit the thesis to the exam office after Approval for Examination (EOG-020) and the thesis is then forwarded to all examiners for review. The examiners will have approximately two weeks to write and send a short report on the scientific content of the thesis. The travel of the external examiner will be organized by the School of Chemistry (Karen Kelly).

The School of Chemistry fully implements the University regulations concerning the PhD Viva. An excellent guide is available for staff and students:

[https://www.nuigalway.ie/media/graduatestudies/files/phdvivaguide/phd\\_viva\\_guide.pdf](https://www.nuigalway.ie/media/graduatestudies/files/phdvivaguide/phd_viva_guide.pdf)

Usually, the *viva voce* will take place by the end of the fourth year of the PhD (or before if approved) following approval of the committee (composed of an internal examiner, an external examiner, and a chair from the school) by the GRC, the Head of School and Dean of College through the portal <https://graduate.nuigalway.ie/users/login/>.

As referred to section 6.3.3 Role of Supervisor in the PhD examination: “The primary supervisor, if present at the *viva*, neither participates nor intervenes in the examination process. The supervisor may only observe the viva proceedings and must leave the examination when final deliberations are taking place...” In the case of co-supervision, only one supervisor attends; the decision on who attends is made by the co-supervisors.

In the School of Chemistry, candidates will be required to give a 30 to 45 min presentation open to the public, after which the *viva voce* will take place, i.e. a private discussion between the student and the examiners (usually 2-3 h).

In Section 6.5 Examination Report of the University Guidelines: “...Where the Examiners are in agreement, they submit a joint report with a recommendation for award or otherwise of the degree on the online system...” “...The report shall be submitted online by the internal examiner to the Examinations Office within two weeks of the viva being held...”

Appendix 1 Regulations for Higher Research. As soon as is practicable after the *viva*, feedback is given to the candidate by the chair of the *viva*.

All the relevant information needed for the *viva* can be found below:

[http://www.nuigalway.ie/media/graduatestudies/files/university\\_guidelines\\_for\\_research\\_degree\\_programmes.pdf](http://www.nuigalway.ie/media/graduatestudies/files/university_guidelines_for_research_degree_programmes.pdf)