

Drexel University

Department of Chemistry

Graduate Student Handbook

2007-2008

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I. Department of Chemistry

A. Welcome

On behalf of the Chemistry Department at Drexel University, I extend to you a warm welcome. From our beginning as a part of the Chemistry and Chemical Engineering Department of Drexel Institute of Technology (which became Drexel University in 1971), we have evolved into a separate department in the College of Arts & Sciences awarding both Masters and Doctoral degrees (the first Ph.D. in 1968) in all major areas of chemistry.

At Drexel we have strong nationally and internationally recognized programs in the areas of analytical, atmospheric, inorganic, organic, physical, and polymer chemistry. In addition, Drexel encourages interdisciplinary activities. Several of our faculty actively collaborate with scientists in areas such as computational science, biological chemistry, and materials science.

Two of our department's most important goals are to increase basic chemical knowledge and its application to fundamental basic research. At the same time, we want graduate students to appreciate practical applications of chemistry in solving the problems that we all face in the modern world. Our department is small enough to provide each student with individual attention while maintaining a community of scholars (faculty, postdoctoral associates, graduate and undergraduate students). The relatively small research groups enable close interaction between students and their Research Advisors. We regard such attention and interaction as important positive features of our program.

Within our department, students and faculty are investigating diverse and exciting research problems (http://www.drexel.edu/coas/chemistry/menu_research.asp). The wide range of faculty interests ensures that we can stimulate the interest of students.

This handbook contains some important information with respect to your graduate career, please read it carefully and review the information, if necessary, with your Faculty Advisor. Of particular help is the checklist at the end of the handbook (Appendix B).

You should also download from the chemistry website the department and university forms (<http://www.drexel.edu/provost/graduatestudies/forms.html>) that are pertinent to the graduate degree(s) you wish to pursue. Departmental forms C2-C3a and C5 are also included at the back of this handbook.

Good luck and best wishes for your future in chemistry!

Lynn S. Penn
Head of Department

B. Advanced Degree Programs in Chemistry

The Chemistry Department offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Chemistry with specialization in the areas of:

**Analytical
Atmospheric
Chemical Education
Inorganic
Materials
Organic
Physical
Polymer**

Several of the above areas have a biological component, *e.g.*, bioanalytical, bioinorganic, bioorganic, and biophysical. While students are free to conduct research in any of the above areas, the cumulative qualifying examinations are limited to 5 areas: analytical, inorganic, organic, physical, and polymer.

The M.S. degree is awarded to students who show competency at the advanced level in the major areas of chemistry. Both a thesis and non-thesis M.S. option is available. Most full-time students complete the M.S. degree within two academic years.

The Ph.D. degree is different from coursework-driven B.S. and M.S. degrees, in that it is self-driven, creative in nature and essentially research-based. The Ph.D. degree is conferred in recognition of breadth of scholarship and scientific attainment plus demonstrated ability to investigate significant scientific problems independently and with insight. It is not earned through completion of courses, by accumulation of credits, or by the time spent in residency, which are secondary requirements. The role of the Research Advisor is to offer guidance and advice to the student, but it's ultimately the responsibility of the student to prosecute the research, develop original contributions to it, and obtain original results of significance suitable for presentation in a Ph.D. thesis, itself written with an appropriately high degree of literary skill. A typical time for the completion of a Ph.D. by a full-time student is 5 years after completing the baccalaureate degree.

C. Admissions Requirements

1. Graduate School requirements

Refer to the section dealing with Admission to Graduate School in the Drexel University Graduate Catalog (<http://www.drexel.edu/em/grad/coas/default.html>) and the attendant "Chemistry Factsheet" on the same web page. These discuss the recommended grade point average for undergraduate preparation, admission as a probationary non-matriculated student or as a non-degree student, and demonstration of competence in English for students whose native

language is not English. The term “graduate” in this handbook conveys the same meaning as “post-graduate” does in other countries.

2. Departmental Requirements

Both full-time and part-time students are required to have a B.S. in chemistry or the equivalent. In other words, there must be evidence of adequate undergraduate preparation in chemistry, physics, and mathematics. Undergraduate chemistry coursework would typically include 34 semester (or 51 quarter credits) divided among general and inorganic chemistry (8-10 semester credits), analytical (6-8 semester credits), organic (6-8 semester credits), physical (6-8 semester credits) and unspecified chemistry electives (0-8). One to two semesters of college physics is also expected, along with differential and integral calculus. If some of the requirements are not met, you may still be admitted but required to make up any significant deficiencies as determined by the Department.

For admission, it is strongly recommended that you take and report to the department results of the Graduate Record Examination (GRE) administered by Educational Testing Services, Inc. (Princeton, NJ). GRE scores are helpful, and in any case are *required* if you are requesting financial support.

D. Advanced Status

a) Post-Masters status

Students who have previously obtained an M.S. degree in chemistry or who have taken several graduate courses in chemistry beyond any that were counted toward their bachelor's degree may be eligible for post-M.S. status in Drexel's graduate program. Given that the graduate course sequence in your major area (analytical, inorganic, organic, physical, and polymer) is usually helpful in preparing for the cumulative exams (cumes), students may prefer to apply for transfer credits from prior graduate coursework rather than post-M.S. status, since the transferring of credits does not accelerate Ph.D. Candidacy requirements.

b) Transfer Credit

Up to 15 credits of graduate coursework at another university may be transferred for graduate credit at Drexel, in accord with the description in the "Transfer Credit" section in the University's Graduate Catalog, (online at <http://www.drexel.edu/provost/graduatestudies/policies.asp#transfercredit>) and with the approval of the Graduate Advisor and the Graduate Curriculum Committee. Credit transfer is initiated by consulting with the departmental Graduate Advisor or with the Graduate Curriculum Committee Chairman, who will normally be prepared to consider such requests only after you have progressed through your third quarter of study in good academic standing. The granting of transfer credit usually necessitates some evaluation of the content of the prior coursework, and the results of your registration exams are also taken into consideration in this regard. Naturally, any course that is counted toward a post-M.S. admission status cannot also be transferred in for the additional credits required for a Drexel degree.

II. Advanced Degree Requirements

A. All Graduate Students

A section of the Drexel University Graduate Catalog entitled "Graduate Regulations" contains a number of general requirements of Drexel's graduate school for any M.S. and Ph.D. candidate (online at <http://www.drexel.edu/provost/graduatestudies/policies.asp>) These are in such areas as: maximum study and work load for teaching or research assistants, registration, plan of study, transfer credit, time limitations, and graduate degree requirements such as residency of at least one academic year. In addition to those listed below, your Research Advisor, the Graduate Curriculum Committee, your Ph.D. Oral Committee and Department Head may make additional requirements in the best interests of the student and the department. The University requires all graduate students to maintain a cumulative GPA of at least 3.0 (B average).

1. Registration Exams

All graduate students, upon entering the program, are required to take a series of two hour written exams in analytical, inorganic, organic, and physical chemistry. The purpose of these exams is to help assess a student's preparation in chemistry to provide a basis for advice on which courses to take. You will be required to make up any deficiency revealed by these exams. If you obtain a score lower than the 25th percentile (statistics provided by the American Chemical Society), you will generally be required to take an additional core course in that area. Similarly, scoring above the 75th percentile will exempt you from the single core course requirement in that area. Exams are given in the week preceding the start of the fall term. If you enter the program during other terms, you will be required to begin taking the registration exams on the first Saturday of the month following your entrance/admission to the program. Non-matriculated students planning to take only one or a few courses for credit in a particular area will generally be required to take the registration exam in that area. If, after eight offered dates, you have not taken all four exams, you will then be required to do the complete graduate sequence in the unexamined area(s).

For these and all other exams, active cell phones are not permitted in the exam room.

2. Course Requirements

Although specific credit hour totals for advanced degrees are given in subsequent sections, some general requirements for all chemistry students include:

- At least 30 credit hours of graduate study must be done at Drexel.
- At least one complete sequence in the student's major area of interest (or other area chosen in consultation with your Research Advisor) must be taken from

CHEM521/522/523 (inorganic core sequence)

CHEM530/531/755 (analytical core sequence)

CHEM541/542/543 (organic core sequence)

CHEM561/562/563 (polymer core sequence)

CHEM555/558/752 (physical core sequence)

- At least one course from each of the following areas: analytical, inorganic, organic and polymer chemistry.
- At least one course from physical chemistry, which must be CHEM555 or CHEM558, *i.e.*, quantum mechanics/molecular modeling or statistical thermodynamics.

In the event that a required course is not offered for a protracted period of time due to low enrollment, the Graduate Advisor may make special allowances.

3. Plan of Study

At the point of choosing your Research Advisor you should file a Plan of Study in consultation with the Graduate Advisor or your Research Advisor. A Plan of Study form (Form D-1) is available from the Office of Graduate Studies at <http://www.drexel.edu/provost/graduatestudies/forms.html> (see *Forms* menu). You should list courses (i) already taken, (ii) courses to be taken, and also (iii) provide tentative dates for your oral candidacy exam and Ph.D. defense. The Plan of Study must then be approved by the Graduate Curriculum Committee (GCC), the Graduate Advisor, the Department Head, and the Graduate Studies Office. Changes in the Plan of Study after submission must have the approval of the GCC.

4. Annual Progress Report

All full-time and part-time research students are required to submit an annual progress report detailing their advancement in research for the preceding year. This two-page report should briefly describe what research was accomplished and how it fits in to your long-range research goals. You may include references for papers published and presentations given (either talks or posters at local or national meetings). If more than one author is listed, you should carefully explain what portion of the work is your own. Your Research Advisor is required to acknowledge and comment on this report. The Graduate Curriculum Committee (GCC) will monitor your research progress using these reports: If your report is deemed inadequate, the GCC will specify the inadequacies and recommend the corrective action you must take to make this and/or future reports satisfactory. If your research progress is deemed inadequate, the GCC will recommend either corrective action that you must take or your dismissal from the graduate program, depending on the circumstances (history of research progress, etc.). Written feedback from both the Research Advisor and the GCC is normally provided by one or more GCC members. Failure to submit a report by the posted deadline may necessitate an oral presentation of the progress report to the full GCC.

As of A/Y 2007-2008, the Graduate Studies Office plans to require Ph.D. students in all disciplines to submit an annual report. This will most likely be submitted at the end of the Spring Quarter, and the student's Thesis Advisory Committee (Form D-5) will apparently have a central role to play in this evaluation.

5. Academic Honesty

All students are expected to maintain the highest professional and academic ethics in all of their efforts, whether these efforts involve research or coursework assignments. It is expected

that Chemistry graduate students (and faculty) will follow the American Chemical Society's academic and professional guidelines, in the forms of the "*Academic Employment Guidelines for Graduate Students and Postdoctoral Associates*" (currently at http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_ARTICLEMAIN&node_id=1134&use_sec=false) & "*The Chemical Professional's Code of Conduct*" (currently at http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_ARTICLEMAIN&node_id=1095&content_id=CTP_004007&use_sec=true&sec_url_var=region1) The University's information about its policies is at http://www.drexel.edu/provost/policies/academic_dishonesty.asp. Of note, is the sometimes-hazy distinction between fair quotation and plagiarism. In general, when one uses the actual wording of a source, it must be placed between quotation marks. Students are expected to abide by the guidelines at: <http://www.library.drexel.edu/resources/tutorials/plagiarism/plagiarism.html> and can find additional details at the "*Citing Sources and Avoiding Plagiarism*" link to the Duke University guide at <http://www.library.drexel.edu/resources/tutorials/citations.html>

During A/Y 2007-2008, the Associate Vice-Provost for Graduate Affairs will be putting in place a procedure through which a student may appeal a decision made by the student's department. The final arbiter in this appeal process will be the Provost. In any case, the chain of responsibility for such matters is: Graduate Advisor & Grad. Curriculum Committee → Head of Dept. → CoAS Associate Dean for Graduate Affairs → Dean of College of Arts & Sciences → Associate Vice-Provost for Graduate Affairs → Vice-Provost for Academic Affairs → Provost.

B. Full-Time students

The university will consider a student to be full-time if (a) they are enrolled for nine credits, or (b) enrolled for six credits and receiving TA or RA support. The minimum enrollment for Ph.D. Candidates (see II.D.3) is one credit per term.

1. Departmental Seminar

All full-time Ph.D. students past their first year of study must enroll in CHEM 865, Chemistry Research Seminar at least one quarter per year. The speakers are usually from other universities, and provide you with the opportunity to obtain a broader perspective of research activities in your own and other fields of chemistry, both in the national and international arena. **ALL FULL-TIME STUDENTS ARE EXPECTED TO ATTEND ALL DEPARTMENTAL SEMINARS** unless it conflicts with a regularly scheduled teaching assignment.

2. Thesis

All full-time students who have received financial assistance from the department are required to write a thesis on original chemical research for their terminal degree (see the appropriate degree requirements below for more information).

As of June 30, 2005, the process for thesis submission is as follows:

1. Format your thesis according to the standards in the Thesis Review Manual that can be saved and/or printed from <http://www.library.drexel.edu/services/thesis/thesismanual.pdf>
2. Submit the final copy of your thesis to your supervising professor for final review and

approval. The supervising professor and department head will acknowledge their approval of your final thesis by signing the Completion form.

3. Submit your thesis to the library in both hard and electronic copy. The archivist and library representative will sign the appropriate lines on the Completion form once library standards have been met. You can view library requirements at

<http://www.library.drexel.edu/services/thesisbinding.html>.

4. Submit the Completion form to the Office of Graduate Studies for final degree clearance.

C. Master of Science Degree

1. Course Requirements

The M.S. degree is awarded after satisfactory completion of a minimum of 45 credit hours in chemistry and related fields. Several general requirements are listed above in Section IIA2. The remaining credits may be chosen from approved graduate courses within the department or from other departments offering courses related to your major area. These courses should be approved in advance by your Research Advisor or the departmental Graduate Advisor.

2. Thesis Option

The chemistry faculty strongly recommends the masters thesis option, but realize it is not always possible or necessary for all part-time graduate students. M.S. candidates who receive financial aid in the form of a teaching assistantship or tuition fellowship are *required* to enroll in CHEM 898 (M.S. Thesis) and submit a M.S. research thesis or equivalent report. Within this option, Drexel's rule is that up to nine credits of coursework may be replaced by CHEM 997 (Research). During the first two-quarters of course work a student should choose a Research Advisor with whom to collaborate in carrying out an original investigation in chemistry. The results will be written up in thesis form and submitted to a M.S. Thesis Review Committee consisting of the Research Advisor and two other departmental faculty suggested by the Research Advisor and approved by the Graduate Curriculum Committee (See the C-5 form at the back of this Handbook). The acceptance by this committee of the M.S. thesis completes the thesis option requirements for the M.S. degree. Both the Thesis Review Manual, which describes the preparation and required format of the thesis, and the library binding requirements are available online as described in section II.B.2. Note also Office of Graduate Studies requirements: if you take a Drexel M.S. degree (3.0 GPA required), you need to apply for readmission to the graduate program (*i.e.*, as a Ph.D. Applicant), and for this, a cumulative grade point average of 3.50 is required.

3. Research Credits for Non-Thesis M.S.

You may count up to three credits of CHEM.997 towards a terminal non-thesis M.S. degree. However, you must submit a written report on the work that satisfies your research advisor. Students continuing without break toward the Ph.D. degree may count up to 9 credits of thesis and/or research toward the M.S. degree, as long as they have at the point of graduation with their M.S. successfully passed their cumulative exams; three credits may be counted, if cumes have been commenced and at least two passed. Note that the requirements are different for students in the B.S./M.S. program; consult the Graduate Advisor or Head of Department.

D. Doctor of Philosophy Degree

This degree is awarded in chemistry and earned in one of the areas of chemistry specified in section IB. The degree recipient must demonstrate scholastic breadth in chemistry as well as contribute significantly to scientific advancement in a chosen major area. Requirements of the program include general coursework; a literature seminar; a candidacy exam procedure; a course on searching the chemical literature or technical writing (if the chemical literature course has already been taken), or an exam in a foreign language (see II.D.4); and successful publication of a Ph.D. thesis (dissertation).

1. Course Requirements

Drexel University requires that 90 credits of graduate level work must be completed for the Ph.D. degree. Excluding research credits, the Chemistry Department requires a minimum of 30 credits of coursework in chemistry, which can include the fulfillment of the core course requirements outlined in Section II.A.2. The remaining coursework will consist of more advanced graduate chemistry electives and special topics courses that are mutually agreed upon by the student and the Research Advisor; ideally, these courses should be specified when a Plan of Study (D-1 form) is submitted. Note that the Chemistry Department requires students to maintain a cumulative GPA of at least 3.0 in lecture courses offered by the department or the Graduate Curriculum Committee (GCC) may recommend that the student not move forward to Candidacy.

Transfer of core course or elective credits from other institutions is possible, under conditions similar to those for the M.S. degree.

The minimum requirement of 30 graduate-level chemistry course credits may often be exceeded, depending on the number of core courses needed (as determined by the registration exams, see section II.A.2), the number of electives in the Plan of Study, or pre-Candidacy registration requirements.

As of A/Y 2007-2008, the Graduate Office will not normally permit a Ph.D. student to take coursework toward an additional degree (*e.g.*, M.B.A.). However, individual courses of interest, or of relevance to your Ph.D. may indeed be permitted. You should use a Drop/Add form for this purpose, obtaining first the approval of your Research Advisor, and then of the Graduate Advisor, who will inform the Graduate Office of this.

2. Literature Seminar

All Ph.D. students are required to give a 30-50 minute literature seminar presentation related to the student's research. The purpose of the literature seminar is to help the student be more prepared for her/his upcoming research project by (i) promoting a greater fundamental understanding about the student's own specific research project and (ii) providing context and perspective about previous accomplishments in the field by other research groups as well as her/his own. The Research Advisor is expected to provide considerable input to the student about the breadth and depth of the literature search, the essential papers to read (and comprehend), and both the historical and current topics to include and/or emphasize in the seminar. The success or failure of the literature seminar will be adjudicated by a Literature Seminar Committee comprised of 5-6 faculty whose composition is further specified below and

must be approved by the Graduate Advisor in advance. The student's Research Advisor is not allowed to serve on the Committee, but may be present during any confidential questioning and/or deliberation by the Committee following the student's presentation and answering of questions from the general audience.

Full-time Ph.D. students should complete the Literature Seminar within 3-6 months of selecting a Research Advisor, although an extension of up to 4 additional months is permissible if the student's written request is approved by both the Research Advisor and Graduate Curriculum Committee. Part-time Ph.D. students have twice as long to fulfill the Literature Seminar requirement, i.e., they should complete it within 6-12 months of selecting a Research Advisor, although an extension of up to 8 additional months is permissible with the aforementioned approvals.

Within the above time frame, the Research Advisor is responsible for setting and enforcing a deadline for the presentation. However, a full-time or part-time Ph.D. student who does not present a seminar until after her/his deadline (or extended deadline) will be required to present a second literature seminar within 3-6 months of the first literature seminar, in an area outside the area(s) of the research group in which the student resides.

The Literature Seminar Committee members will ask questions specific to the research seminar, as well as general questions related to the candidate's intellectual preparedness for the remaining graduate program experience. The questioning of the student by the committee will last up to one hour, depending on the preparation of the student. Following the committee's questioning, the student will be excused and the committee will reach a decision, which will then be conveyed immediately by the Chairman to the student. A satisfactory outcome enables the student to continue toward the Ph.D. degree (begin taking or continue taking cumulative exams, etc.).

In the event that a student's Literature Seminar is not completely satisfactory, the Committee may require supplementary written material and a short additional presentation or a second full-length literature seminar, whichever is more appropriate as determined by the Literature Seminar Committee in consultation with her/his Research Advisor. Any additional requirements must be completed within one month of the original seminar. The Committee Chairperson will notify the student of the final outcome in two weeks or less via a departmental C-3a form.

The Ph.D. student presenting the seminar, in consultation with his/her Research Advisor, selects the Chair and members of the Literature Seminar Committee, in accordance with the university's general rules for the selection of doctoral student committees:

- The Ph.D. student's Research Advisor may not be a member of the Committee, and may contribute to the proceedings only if permitted by the Chair.
- The Committee *must* include one member from *outside the Department*, who may be from another university, and must be a tenured or tenure-track faculty member from an appropriate discipline in a Ph.D.-granting institution.
- The Committee must include at least one member of the departmental Graduate Curriculum Committee.
- One voting member of the examining Committee who is of emeritus/retired status from Drexel (as an "internal" member) or another chemistry graduate program is permissible.

- Note that although a total of five committee members is required by Drexel, a sixth is *strongly recommended* in case of some unavoidable absence. Additional members not fulfilling the above requirements may serve, but have no vote.

Further details worth noting regarding the Literature Seminar are:

- The Ph.D. student must be registered for 3 credits of CHEM865 during the term in which the Literature Seminar is presented.
- A departmental C-3 form is required for the scheduling of the Literature Seminar and the appointment of the committee members. The Literature Seminar must be scheduled at least 3 weeks in advance (preferably more) for coordination with chemistry seminars by external speakers.
- The Research Advisor will advise the student on the suitability of her/his Literature Seminar (breadth and depth of the literature search, the essential papers to read, the historical and current topics to include and/or emphasize, etc.), as well as the title and abstract that must be distributed at least 1 week in advance to the Chemistry Department for announcement/publicity purposes.
- The Seminar Presenter must ensure that all the members of her/his Literature Seminar Committee know in advance the date, location and time of the Seminar.
- The title, abstract, date, time and location of the Literature Seminar must be advertised in writing in the Department and on the departmental web site at least a week in advance.

The Graduate Curriculum Committee will provide a summary of the evaluation guidelines to assist both students and examiners.

3. *Ph.D. Candidacy*

The University considers students “Ph.D. Applicants” until they have passed into Ph.D. Candidacy status. In order to formally become a “Ph.D. Candidate” in Chemistry, as of Winter 2007, you must (a) have passed at least three cumulative exams, and (b) have completed 45 credits of graduate work (or 15 credits at Drexel, if you entered with “post-Masters’s” status). A set of University D-4/4a forms is submitted at this stage; you should fill out your relevant information on the D-4 and submit it to the Graduate Advisor (along with a copy of your M.S. transcript if you entered post-M.S.).

Within six months of achieving Candidacy, you must set up a Ph.D. Advisory Committee, and submit a D-5 form. The Graduate Office recommends that the Committee include an appropriate member from another institution (effected during AY 2007-2008).

a) Written (Cumulative) Exams

Written exams designed to evaluate your chemical knowledge (normally in your major area of interest) are given monthly during the academic year and occasionally during the summer at the discretion of the faculty. They are normally held on the first Saturday of each month, in Disqué-307 at 10:00 am; the exact dates and times are posted on the Departmental website.

You should begin taking these exams during your second year in the program. Cumulative exams must be taken sequentially, with one unexcused absence allowed, until **five are passed or six are failed**. Six failures are a basis for dismissal from the Ph.D. program. The

Department requires that you be registered for at least one course during the term in which you take your first cume.

The topic(s) of the exams may, or may not, be announced prior to the exam, depending on the sub-discipline. Note that more than one examination may be taken on a given exam date; however, a maximum of ten attempts are allowed. If you do elect to take more than one exam on a particular date, you should notify the faculty proctor of your intentions prior to the examination. It is your responsibility to make sure that the appropriate faculty members are aware of the need to provide a cumulative exam for you to sit in any given month. This is particularly so if you are taking an exam outside your normal research field. At least three of the five passes must be in the student's selected area of specialization; it is therefore important that your specialization be chosen carefully in consultation with your selected Research Advisor.

4. Thesis Advisory Committee

Following the completion of the cumulative exams, but no less than three (3) months prior to the final defense, the Ph.D. Candidate must select, in consultation with her/his Research Advisor, a Thesis Advisory Committee (Form D-5). The Thesis Advisory Committee is normally composed similarly to (and is often the same as) the Ph.D. Final Oral Defense Committee. Regulations for the selection of both committees are the same (see section D.6 below), *except* that outside member of the Thesis Advisory Committee need only be an appropriate faculty member *outside the department*, whereas the outside member of the Ph.D. Final Oral Defense Committee must be an appropriate faculty member *outside the university*.

5. Communication Requirement

The communication or language requirement may be satisfied by completing a graduate course in Technical Writing (e.g., COM 510) or in Chemical Information Retrieval (CHEM 767) or by demonstrating *via* written examination a reading knowledge of German, French, Japanese, or Russian*. If CHEM 767 is taken, a second course in technical writing is recommended.

*In special instances another language can be substituted, but only if it has a significant chemical literature.

6. Ph.D. Thesis

A Ph.D. thesis, the heart of the Ph.D. degree, must be written and correctly formatted by the student, accepted by the Research Advisor, presented to the Ph.D. Final Oral Defense Committee (Form D-6), and defended orally. A copy of the Thesis Style Manual may be downloaded from Office of Research and Graduate Studies website, <http://www.research.drexel.edu/>.

Members of the student's Ph.D. Final Oral Defense Committee should be selected in mutual consultation with the student's Research Advisor as the student nears completion of her/his dissertation, but no later than four (4) weeks prior to her/his final defense. The Committee is normally composed similarly to (and is often the same as) the Ph.D. Thesis Advisory Committee. The Ph.D. Candidate's Research Advisor, the Graduate Advisor, and the Graduate Studies Office must approve the composition of the Ph.D. Final Oral Defense Committee. In general:

- The candidate's Research Advisor may not be a member of the Committee, and may contribute to the proceedings only if permitted by the Chair.
- The Committee *must* include one member from *outside the University*, who must be a tenured or tenure-track faculty member from a Ph.D. granting institution and from an appropriate discipline.
- The Committee must include at least one member of the departmental Graduate Curriculum Committee.
- One voting member of the Committee who is of emeritus/retired status from Drexel or another chemistry graduate program is permissible.
- Note that a total of five committee members is required by Drexel – a sixth is strongly recommended in case of some unavoidable absence. Additional members not fulfilling the above requirements may serve, but have no vote.

It is the responsibility of the student, not his/her Research Advisor, to submit an acceptable Ph.D. thesis. However, the final defense is not to be scheduled until the Research Advisor and the Graduate Advisor have approved the thesis, as indicated by his/her signature on Graduate Studies Form D-6 (Final Oral Exam). Members of the examining committee will often be willing to read and comment on at least one draft of the thesis before presentation of the finished version to the committee for the defense. A copy of the finished thesis must be received by each member of the examining committee no later than **two weeks** prior to the final defense. The date, time, location and title of the final defense must be announced publicly in writing and on the departmental web site at least one week prior to the date of the oral presentation. Inclusion of a brief abstract with the announcement is encouraged. When scheduling your final defense, you should ask the departmental seminar coordinator and/or the department secretary for help in obtaining a suitable room. The final defense of the Ph.D. thesis consists of two parts:

- A public 40-45 minute seminar on the thesis research followed by general questions from the audience with the committee in attendance.
- A private (candidate plus committee) question/answer session (Final Oral Exam), convening shortly after the public seminar.

III. Graduate Advising

Students who have selected a Research Advisor should consult that person for information and advice on the graduate program in chemistry. For more general or procedural information, full-time students should consult with the Departmental Graduate Advisor, while part-time students should confer with either the Departmental Graduate Advisor or the Department Head.

Appeal Procedure.

In the case of some irresolvable disagreement between the student and the research advisor, the student should consult with the Graduate Advisor and the Head of Department. The next steps of appeal are to the College of Arts & Sciences' Associate Dean for Graduate Studies, then the Dean and the Vice-Provost for Graduate Studies. The Provost is the final arbiter. The university will be setting a formal appeals procedure in place during 2008.

IV. Graduate Support

Financial aid is typically available in the form of a teaching assistantship (TA), research assistantship (RA), and/or tuition remission. Exceptional applicants will also be nominated for a supplemental Dean's Fellowship (\$5,000/year) or Provost's Fellowship (\$5,000/year). Teaching assistantships and tuition remission are available from the department on a *competitive basis* and are therefore *not automatically given to every student who is admitted into our graduate program*. Both incoming and resident graduate students are considered by request for a departmental TA/tuition remission. RAs are available from individual faculty members via their research grant funds. ***Please note that the university does not allow you to hold any other employment in addition to a full teaching or research assistantship.***

New and full-time M.S. & Ph.D. students who are self-supporting (don't have a TA) and have GPA's of 3.5 or greater are eligible to apply for a one-time \$3,000 Dean's Fellowship offered by the Vice-President of Enrollment Management. This Fellowship is applied as an offset against the student's tuition bill.

A. Teaching Assistantship (TA)

The current standard Teaching Assistantship (TA) is a 12-month, October-September appointment. Teaching Assistants are required to teach for three out of the four quarters (normally Fall-Winter-Spring); the possibility of not teaching during a quarter other than Summer is dependent on Departmental teaching needs. Students with TAs usually also receive tuition remission for the (substantial) costs of graduate tuition. M.S. students are not eligible for TA support at Drexel, and tuition remission is normally not awarded without an accompanying TA or RA appointment.

In return for departmental support (TA and tuition remission), the chemistry department expects each teaching assistant to carry out his or her duties conscientiously and responsibly. Indeed, failure to do so (*e.g.*, not enforcing the eye protection or other safety requirements in lab classes) can result in the loss of the assistantship. If, because of some emergency (such as illness or getting snowed-in during winter), you are unable to attend a class, make sure that you have made a mutual "back-up" agreement with another instructor, so that one can take the other's place at short notice. The faculty generally does likewise.

The duties of a teaching assistant are somewhat similar to those of the other teaching staff in the department, generally involving the instruction and guidance of undergraduates in laboratory and recitation classes, most frequently in freshman chemistry courses (CHEM.101-CHEM.167). Each teaching assistant works in conjunction with, and under the guidance of one of the chemistry faculty, who has responsibility for the design and execution of the course sequence, and for giving the lectures in the course. When assigned to a course, you should therefore consult with the faculty member who is in charge of the course to determine what your duties will be for the coming quarter. The Associate Head of Department is responsible for constructing the teaching duty assignments.

The types of activities in which you will find yourself involved include: running labs and recitations; grading of students' lab reports, recitation quizzes and exams; and helping faculty to develop and prepare materials for labs and exams. This translates into an average of 7 hours per week of classroom activity, plus roughly twice that number of hours per week of related work outside the classroom.

New teaching assistants are usually assigned to one of the freshman sequences. Because these are large courses, there are often substantial numbers of recitation and/or lab instructors involved, so that it is necessary to hold informational/organizational meetings weekly; attendance at these meetings is mandatory unless the instructor in charge specifies otherwise.

B. Tuition Remission

Remission of graduate tuition is awarded only in conjunction with graduate teaching assistantships. In the first year of graduate study up to 9 credits per quarter are awarded; more senior students receive less than this, according to the needs of their Plan of Study and departmental budget allowance. Following achievement of Ph.D. Candidacy, full-time students will be billed for and/or receive tuition remission of only 1 credit per quarter, but may register for additional credits with no additional charge.

C. Research Assistantship (RA)

A Research Assistantship (RA) may be arranged with your Research Advisor if sufficient grant funds are available; the stipend is determined by the Research Advisor. Part of the working relationship between a Research Advisor and a research student is that there must be a mutual agreement as to what tasks and responsibilities are involved in a particular RA. When you become interested in doing research work with a given faculty member, you may want to inquire about the possibility of a Research Assistantship. M.S. students are eligible for RA support at Drexel.

D. Satisfactory Progress

Continuation of any of the above forms of financial aid is contingent on satisfactory academic and research performance. Performance is evaluated annually by the Graduate Curriculum Committee and based upon the student's academic transcript and research progress reports (latter described in section II.A.4). The department generally supports Ph.D. students (via stipend and/or tuition remission) for no more than 20 quarters of graduate work from the date in which they entered the graduate program, except in the case of a department-approved leave of absence. Support beyond the first 20 quarters is strictly at the discretion of the department and/or the Research Advisor if the latter has funds to support a graduate student. M.S. students are not eligible for teaching assistantships (section IV.A), but may receive financial aid from the university for their first 8 quarters of graduate study. M.S. students may also apply for a one-time Dean's Fellowship of \$3000 (see IV. Graduate Support) if their GPA is 3.5 or higher.

E. Taxes on Fellowships

Some foreign student holders of graduate fellowships (*e.g.*, the P.R.C., Poland) find that tax treaties between their home country and the U.S. hold advantages for them with respect to Federal income taxes, which U.S. Residents rarely escape. City of Philadelphia and Pennsylvania state income taxes on Fellowship stipends are difficult to avoid. Tuition remission is usually not taxed.

V. Course Selection

A. Core Courses

1. Analytical Chemistry

CHEM530, Spectroscopic Methods, Fall: Introduction to optics, interaction of electromagnetic radiation with matter, design of optical instruments, survey of spectroscopic methods of analysis.

CHEM531, Chromatographic Methods, Winter: Principles of separation, pressure- and voltage-driven flow, separative and dispersive transport, resolution theory, survey of chromatographic instrumentation (pumps, injectors, columns, detectors), survey of chromatographic separation modes.

CHEM755, Mass Spectrometry, Spring: Basic interpretive skills for organic & biochemical analysis; survey of ionization methods, ion selection or separation techniques and detection; applications in chemistry & biology.

2. Inorganic Chemistry

CHEM521, Inorganic Chemistry I, Fall: Electronic configuration of the elements and related chemical properties. The nature and structure of simple binary and ternary inorganic lattices as a function of constituent element type. Intermolecular interactions. Born-Landé model. M^{n+} in solution, chelation, macrocycle effect, HSAB principle. MO's for diatomics; bands, conductors.

CHEM522, Inorganic Chemistry II, Winter: Molecular symmetry and group theory with applications to the bonding, magnetic and optical properties of inorganic molecules. Transition metal cations in crystal fields of various symmetries, crystal field stabilization energy. Molecular orbital construction for polyatomic and centric molecules. Relationships between structure and vibrational spectra for inorganic molecules.

CHEM523, Inorganic Chemistry III, Spring: Organometallic compounds. Kinetics of complex formation, electron-transfer. Metal ions in biological systems.

3. Organic Chemistry

CHEM541, Organic Chemistry I, Fall: Spectroscopic methods of analysis, including mass spectrometry (MS, principles of MS, the mass spectrum, fragmentation mechanisms, special topics), Infrared (IR, principles of IR spectroscopy, the infrared spectra of functional groups), Ultraviolet Spectroscopy (UV, principles of UV, UV absorption by organic functional groups, special topics); Nuclear Magnetic Resonance (NMR, theory of NMR, Proton NMR (chemical shifts, coupling constants, structural

determination using NMR, shift reagents and Chiral solvating agents), Carbon NMR (FT-NMR, chemical shifts, special topics).

CHEM542, Organic Chemistry II, Winter: Static or "Classical" Stereochemistry (stereoisomerism, chirality, stereogenic and chirotopic atoms, internal stereocomparisons [homotopic and heterotopic groups and faces, prochirality, applications to NMR, asymmetric syntheses, biochemical problems such as enzyme reactions and configurational determinations], conformational analysis of cyclic and acyclic molecules. Dynamic Stereochemistry (relationships between structure, geometry and reactivity, physical methods of conformational determinations, use of stereochemistry in mechanistic studies.

CHEM543, Organic Chemistry III, Spring: Mechanisms of organic reactions and the techniques of studying them: acyl and alkyl substitution, carbocations, carbanions, free radicals, carbenes, nitrenes, ylides, simple kinetics, isotopic labeling, cross-over experiments, acidity concepts, substituent effects, Hammett equation.

4. Physical Chemistry

CHEM557, Physical Chemistry I, Fall: Schrödinger's equation and particle-wave duality, atomic structure and spectra, optical spectroscopy on molecules (rotational, vibrational and electronic spectra) molecular symmetry, design of modern spectrometers, magnetic resonance spectroscopy.

CHEM558, Physical Chemistry II, Winter: Covers statistical mechanics of distinguishable and indistinguishable particle systems, and thermodynamic functions for both systems and chemical equilibrium.

CHEM659, Physical Chemistry III, Spring: Experimental spectroscopy; review of quantum mechanics; interaction of electromagnetic radiation with molecules; Atomic spectroscopy; molecular orbital theory; electronic spectroscopy; vibrational spectroscopy.

CHEM555, Quantum Chemistry Of Molecules I, Winter: Covers general properties of operators; Schrödinger's equation and its solutions for a particle in a box; harmonic oscillator, tunneling problems, rigid rotor, and the hydrogen atom; approximation methods; and absorption of radiation and selection rules.

5. Polymer Chemistry

CHEM561, Polymer Chemistry I, Fall: Scope of polymer chemistry & science; structure/property relations; step (condensation), free-radical, cationic anionic, group-transfer, ring-opening polymerization; stereochemistry of polymerization; coordination and metathesis polymerization; non-classical chain polymerization; inorganic polymers; reactions and degradation of polymers; template polymerization; biological polymers.

CHEM562, Polymer Chemistry II, Winter: Kinetics and thermodynamics of polymerization; theories for and control of step-polymerization and gelation; copolymerization composition; polymerization-depolymerization equilibria; polymer characterization; determination of molecular weight and its distribution by end-group analysis, membrane osmometry, vapor-phase osmometry, light-scattering, solution viscosity, and gel-permeation chromatography.

CHEM563, Polymer Chemistry III, Spring: Basic concepts on the properties of materials; rubber elasticity; morphology; viscoelasticity; T_g and T_m theories; thermal analysis; dynamic mechanical analysis; X-ray diffraction; spectroscopic techniques; thermodynamics of polymer solutions; conformational analysis and computational methods; basic testing, fabrication and processing; electrical, optical and magnetic properties; frontiers in polymer research.

B. Special Topics Courses

In addition to the graduate courses listed in the Graduate Catalog, each quarter the graduate faculty offer a variety of special topics courses (CHEM680-0XX & other CHEM700-CHEM800 level courses) worth 1-5 credits. A listing of those courses currently on the books is given below. These courses are not usually taken during the first couple of quarters of study, because they usually have content more specialized than that of the core courses and are often more research-oriented. Consult the Graduate Catalog and the quarterly class listing schedule for more information.

Several of these are seminar-style courses in the various areas of Chemistry, such as the CHEM 860-series. Not all courses are offered every year, if you are interested in a particular course you should contact the listed faculty member for course schedule information. Note that the number of these course credits that can be counted toward the requirements for the M.S. or Ph.D. is not unlimited (particularly for seminar-type courses); you should consult one of the Graduate Advisors regarding this issue. This also applies to CHEM 865 (Chemical Research Seminar), credit for which can be counted once toward the M.S. degree.

Course	Course Title	Usual Instructor	Notes
CHEM 656	Quantum Chemistry II	Rosenthal	
CHEM 780	Experimental NMR Lab		2
CHEM 751	Magnetic Resonance in Chemistry		
CHEM 752	Biophysical Chemistry	Schweitzer-Stenner	1
CHEM 753	Chemical Instrumentation Lab	Owens	1,3
CHEM 767	Chemical Information Retrieval	Owens	1
CHEM 771	Organometallic Chemistry	Addison	
CHEM 772	Inorganic Biochemistry	Addison	
CHEM 774	Electrochemistry for Chemists	Addison	
CHEM 782	Electronics for Chemical Instrumentation I	Bandy	
CHEM 783	Electronics for Chemical Instrumentation II	Bandy	

CHEM 788	Atmospheric Chemistry	Bandy	
CHEM 789	Experimental Design & Statistics in Chemistry	Owens	1
CHEM 791	Modern Organic Synthesis Topics	Wade	
CHEM 792	Advanced Organic Synthesis I	Hutchins	1
CHEM 793	Advanced Organic Synthesis II	Hutchins	1
CHEM 794	Organic Reaction Mechanisms	Wade	
CHEM 862	Topics in Inorganic Chemistry	Addison	1,7
CHEM 865	Chemistry Research Seminar		4
CHEM 866	Topics in Polymer Chemistry	Wei	
CHEM 868	Topics in Analytical Chemistry Examples: Advances in Separation Science, Chromatographic Data Acquisition & Interpretation, Capillary Electrophoresis	Bandy/Foley/Owens	1
CHEM 997	Research	Assoc. Head	
CHEM 898	M.S. Thesis	Assoc. Head	5
CHEM 998	Ph.D. Thesis	Assoc. Head	6

Notes:

- (1) These courses have been offered regularly recently.
- (2) This course has CHEM541 as prerequisite/co-requisite.
- (3) Should not be taken for more than 6 credits total.
- (4) This course is normally scheduled to meet almost weekly during the fall, winter, and spring quarters. All full-time graduate students are expected to attend department seminars every term unless they have a teaching or class conflict.
- (5) For M.S.- thesis option candidates only.
- (6) Enrollment for "Ph.D. Candidates" only.
- (7) Most recently, "Magnetism & Paramagnetic Resonance"

VI. Selection of Research Advisor

It is required for all graduate students wishing to engage in research to select a Research Advisor who is a full-time tenure track faculty member in the department. It is possible to perform graduate research under the direction of one of the research faculty associated with the department as a co-advisor, but the Research Advisor must be in full agreement with the arrangement.

After arriving at Drexel, a Ph.D. student should speak with as many of the faculty as possible, including all those in the student's major area of interest, about present and future research plans. It is required (see Departmental C-2 form) that you interview at least six faculty members about research. Indeed, before commencing any research in association with a faculty member, you must submit the Departmental C-2 form signed by those faculty members interviewed before the choice of Research Advisor is approved by the Department. At this point, you will jointly designate the area(s) in which you will do your cumulative exams.

Although you must choose your Research Advisor no later than the end of the third quarter of your first year, it's better to do this earlier, so that you can start your thesis research

earlier. If you intend doing a thesis-option M.S. degree, it's advisable to commence that research as soon as possible. When talking to faculty members about their research, feel free to ask for reprints of recent papers, preprints of papers in press, and planned research as reflected in submitted research proposals. When both you and the faculty member reach agreement regarding the general area of research to be done for the Ph.D. thesis, you should fill out Graduate School Form D-2. Thus, you will be expected to start research before or during your first summer of residence at Drexel.

Even with the best planning it sometimes becomes necessary for a student to switch Research Advisors. It is recommended that the student discuss the situation with either the Graduate Advisor or Department Head prior to completing and submitting a new C-2 form. Students may switch Research Advisors once during their graduate program. Except under exceptional circumstances approved by the Graduate Curriculum Committee and Head of Department, switching Research Advisors for a second time is not permitted.

VII. Appendices

A. Department Directory

1. Chemistry Department Personnel

Head of Department

Dr. Lynn S. Penn

Associate Department Head

Dr. Paul W. Deroo

Graduate Advisor

Dr. Anthony W. Addison

Graduate Curriculum Committee

Dr. Joe P. Foley, Chair

Dr. Anthony Addison

Dr. Jean-Claude Bradley

Dr. Peter A. Wade

Mr. Christopher Castillo

Safety Committee

Dr. Kevin Owens, Chair

Dr. Anthony Addison

Dr. Anthony Wambsgans

2. Chemistry Department Faculty

Name	Office	Office phone	Lab phone	Title	Area
Dr. Tony Addison	12-418	895-2646	895-1697	Professor	Inorganic
Dr. Alan Bandy	5-411	895-2640	895-1890	Professor	Atmospheric/ Analytical
Dr. Jean-Claude Bradley	12-510	895-2647	895-1806	Associate Professor	Materials
Dr. Joe Foley	12-211	895-6218	895-1702	Professor	Analytical
Dr. Robert Hutchins	5-412	895-2644		Professor Emeritus	Organic
Dr. Frank Ji	12-507	895-2562		Associate Professor	Analytical
Dr. Daniel King	12-509	895-0571	895-0571	Assistant Professor	Chemical Education
Dr. Kevin Owens	5-415	895-2621	895-6276	Associate Professor	Analytical
Dr. Elizabeth Papish	5-409	895-2666	895-1890	Assistant Professor	Inorganic
Dr. Lynn S. Penn	12-306	895-2639	895-2976	Professor	Polymer/Materials
Dr. Carey Rosenthal	5-412	895-2641		Associate Professor	Theoretical
Dr. Reinhard Schweitzer-Stenner	12-606	895-2268	895-2654	Associate Professor	Physical
Dr. Karl Sohlberg	12-222	895-2653	895-6951	Associate Professor	Computational/Physical
Dr. Sally Solomon	12-224	895-2642	895-1693	Professor	Chemical Education
Dr. Peter Wade	12-508	895-2652	895-1699	Associate Professor	Organic
Dr. Yen Wei	12-211	895-2650	895-1644	Professor	Polymer/Materials
Dr. Jun Xi	12-218	895-2648	895-2655	Assistant Professor	Organic/Biochem.

3. Associated Research Faculty

Name	Office	Office phone	Lab phone	Title	Area
Dr. Jian-Min Yuan	12-819B	895-2722		Professor	Physics

4. Chemistry Department Staff

Name	Office	Phone	Title
Mr. Thomas Cachaza	12-113	895-2661	Glassblower II
Mr. Edward Doherty	12-314	895-2660	Operations Manager
Ms. Tina Lewinski	12-315	895-0567	Program Coordinator
Ms. Virginia Nesmith	12-305	895-2638/2639	Office Services Coordinator
Mr. Edward Thorne	12-316	895-1331	Laboratory Technician III
TBA	5-410	895-2649	Electronic Instrumentation Specialist

5. College and University Personnel

Name	Office	Phone	Title
Dr. Donna Murasko	McAlister -4020	895-2620	Dean, College of Arts & Sciences
Mr. Taz Kwok	Randell- 240	895-2498	Coordinator of Graduate Studies

Notes:

All telephone numbers are in area code 215.

Building Information: 1-Main Building, 5- Stratton Hall, 9b- MacAlister Hall, 12- Disqué Hall

B. Timeline Checklist

Attendant to several of the items documented in this handbook there are formalities that must be observed. You may obtain the necessary forms online at <http://www.drexel.edu/provost/graduatestudies/forms.html>; these forms should be filed at the appropriate times. **It is very important for you to attend to the timely filing of each form since you will be held responsible for meeting various deadlines (see table below).** For full-time students who typically enter our program in the fall quarter, the third quarter on this checklist (when D-1, C-2, and D-2 forms are due) will be the spring quarter. Part-time students are expected to progress at a minimum of half the rate of full-time students. You are considered to be full-time in the program if you register as a full-time student or receive any stipend from the University while enrolled in any graduate courses.

Deadline	Form (1)	Action
Beginning of third quarter		Interview prospective Research Advisors
End of third quarter	D-1	File <i>Plan of Study</i> (2,3)
End of third quarter	C-2	File <i>Graduate Research Advisor Interview Form</i>
End of third quarter	D-2	File <i>Supervising Professor Appointment Form</i>
End of third quarter		Start doing research
Beginning of 2 nd quarter until end of 5 th quarter	C-3, C-3a	Schedule and give Literature Seminar
Start of second year		Start taking cumulative exams
End of second week of given quarter		Apply for M.S. degree (at SAS) if appropriate
Start of third year	C-4	File <i>Ph.D. Oral Candidacy Exam Form</i>
Four weeks prior to candidacy exam	D-3	File <i>Candidacy Examination Appointment Form</i>
Day of candidacy exam	D-4, D-4a	Bring <i>Candidacy Examination Forms</i> to oral exam
After passing candidacy exam	D-5	File <i>Thesis Advisory Committee Appt Request Form</i>
Four weeks prior to Ph.D. exam		Submit Ph.D. thesis to format checker
Four weeks prior to Ph.D. exam	D-6	File <i>Final Oral Defense Committee Appointment & Schedule Form</i>
Day of Ph.D. exam	D-7	Bring <i>Report of the Final Oral Defense Committee</i>

		<i>Form to exam</i>
When thesis corrections finished		File <i>Completion Form</i>
One month prior to commencement		File <i>Application for Ph.D. Degree Form</i> (at SAS)
Before leaving Drexel		Return all keys and other borrowed items

Notes: Further detailed information is contained on the forms themselves.

- (1) After obtaining the appropriate signatures from your Research Advisor and/or committee members, all University forms (D-1 through D-7 and the Completion Form) must be submitted to the Graduate Advisor, who will forward them to the Graduate Studies Office; Department forms (C-2 through C-4) must be submitted to the Graduate Advisor (with the necessary signatures).
- (2) Ph.D. students & thesis-M.S. students.
- (3) The Graduate Advisor or Chair of the Graduate Curriculum Committee can check over your coursework with you.

C. Department Forms

- 1. Graduate Research Advisor Interview Form (Form C-2, revised 11/21/08)**
- 2. Ph.D Literature Seminar Scheduling and Committee Form (Form C-3)**
- 3. Ph.D Literature Seminar Evaluation Form (Form C-3a)**
- 4. Masters Thesis Review Committee Form (Form C-5)**

CHEMISTRY DEPARTMENT

Form C-2: GRADUATE RESEARCH ADVISOR INTERVIEW FORM

STUDENT NAME: _____

I am interested in starting my _____ M.S. thesis or non-thesis research or _____ Ph.D. thesis research

Interviewed faculty signatures (below)*:

Date:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Having interviewed the above faculty members (at least 6), I submit my choices of faculty advisor as

_____ (first choice)
_____ (second choice)
_____ (third choice)

Based on faculty eligibility and pending his/her agreement, _____ is named as your Research Advisor.

Departmental full-time Graduate Advisor **or** Department Head signature:

_____ Date: _____

I agree to act as research advisor to the above student. The student's "specialty area" for Ph.D.

cumulative exams will be: _____.

Research Advisor signature _____ Date: _____

If a co-advisor is also selected, this person is _____

Co- Advisor signature _____ Date: _____

Submit completed form to the Graduate Advisor. Ph.D. students must also submit Drexel forms D1, D2 & D5.

* You must be sure to include at least three of any new faculty appointed during the last four years (Drs. Frank Ji, Daniel King, Elizabeth Papish, Lynn Penn, Jun Xi). A complete list of chemistry faculty may be found at www.drexel.edu/coas/chemistry/people/.

CHEMISTRY DEPARTMENT

C-3

Ph.D. LITERATURE SEMINAR SCHEDULING & COMMITTEE FORM

STUDENT NAME: _____

Research Advisor: _____

Date/time of Literature Seminar: _____

Location of Literature Seminar: _____

Title of Literature Seminar: _____

Seminar **Abstract** ($\leq$ 250 words):

Proposed Seminar **Committee**: _____ Chairperson

_____ (external department member)

Research Advisor signature _____ Date: _____

Graduate Advisor signature _____ Date: _____

Submit completed form to Departmental Graduate Advisor.

cc: File, Research Advisor

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CHEMISTRY DEPARTMENT

C-3a

Ph.D. LITERATURE SEMINAR EVALUATION FORM

STUDENT NAME: _____ Research Advisor: _____

Title of Literature Seminar: _____

Literature Seminar Results

We have examined the above named student on _____ (date) at _____ (time).

Based on the student's presentation and answering of questions:

_____ We recommend that the student has satisfactorily met the Literature Seminar requirement.

_____ We recommend that the student has not satisfactorily met the Literature Seminar requirement,
and suggest the following course of action on her/his part: _____

_____.

Literature Seminar Committee

Each committee member must sign below to show either agreement or dissent with the overall result.

Agree:

Chair _____	Signature _____
Name _____	Signature _____
Name _____	Signature _____
Name _____	Signature _____
Name _____	Signature _____
Name _____	Signature _____

Dissent:

Name _____	Signature _____
Name _____	Signature _____
Name _____	Signature _____

Research Advisor signature _____ Date: _____

Graduate Advisor signature _____ Date: _____

Submit completed form to Departmental Graduate Advisor.

cc: File, Research Advisor

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CHEMISTRY DEPARTMENT

C-5

MASTERS THESIS REVIEW COMMITTEE

STUDENT NAME: _____

Title of Masters Thesis: _____

Expected Completion Term/Date: _____

Suggested Thesis Reviewers:

Research Advisor signature _____ Date: _____

Graduate Advisor signature: _____ Date: _____

Submit completed form to Graduate Advisor.

cc: File, Research Advisor

GCC Rev Sept.03