

*Chemistry Department*

**Saint Louis University**

**Handbook**

**for**

*Ph.D. Program*

**Updated in 2016**

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For all general policy pertaining to graduate education at SLU, please consult the Graduate Education Catalog at <http://www.slu.edu/graduate-education/current-students>.

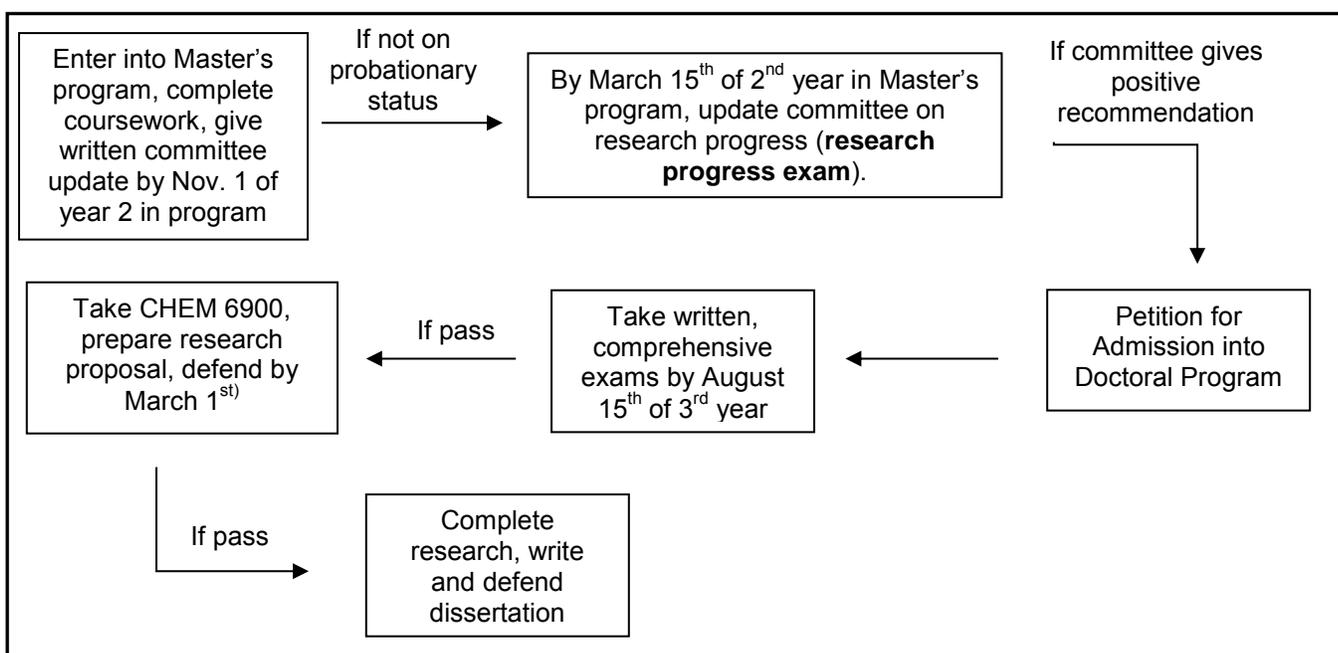
## A. General Program Overview

### Degree Program Overview

The Ph.D. degree is a research-intensive program that involves coursework, a written examination, a research proposal, and a dissertation. In terms of credit hours, a total of 39 credit hours are required, with 12 hours coming from dissertation research credits. An appropriate coursework track will be developed by the student and mentor and approved by the Graduate Program Director. In most cases, a portion of these units may be fulfilled from chemistry lecture courses and Introduction to Research courses taken as part of the Master's program at SLU. In most cases, students will enter the Ph.D. graduate program in the Department of Chemistry through the Master's program. Students can also enter directly into the Ph.D. program if they already have a M.S. degree from another institution. Both situations are outlined below.

### Typical Track for SLU students in the M.A. program wanting to transition into the Ph.D. program.

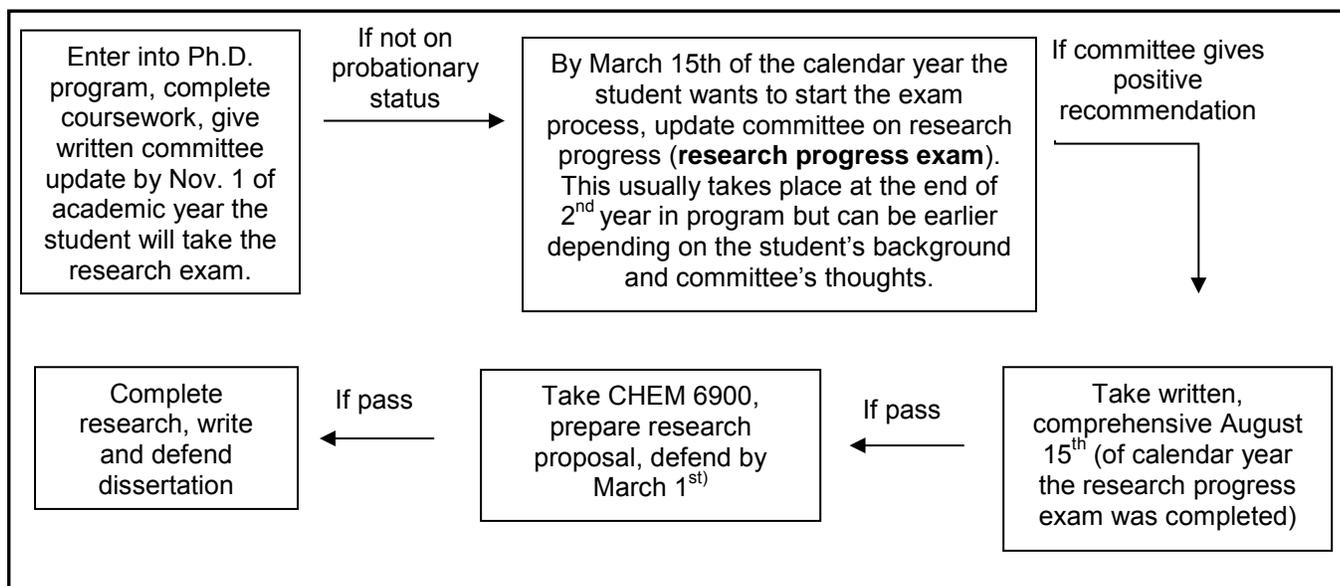
In most cases, students will enter the Ph.D. graduate program in the Department of Chemistry through the M.A. program. During the end of the M.A. degree (typically the end of year 2), students wanting to pursue a Ph.D. will formally petition into the Ph.D. program (details described in the following pages). A typical track is generally overviewed below, with more details on each step being found throughout this handbook. See details on each process for situations that do not fit this overview (such as a failing grade on any step). A key part of the transition process is the research progress exam in year 2. This exam is explained in more detail in Section J of this handbook (page 11).



## Typically Track for student who has a M.S. from another program and wants a Ph.D. from SLU

Students can also enter directly into the Ph.D. program if they already have a M.S. degree. By Nov. 1 of the academic year the student wants to start the exam process, the student should form a 3-person committee. This usually happens in the student's 2<sup>nd</sup> year in the program (by Nov. 1 of the 2<sup>nd</sup> year) but may be earlier (in year 1) depending on the student's background and the committee's thoughts. By Nov. 1<sup>st</sup>, the student should submit a 2-3 page written document that outlines the student's research project. This update should include an introduction and an overview of the results obtained to dates. Figures may also be included. Any submitted papers (or soon to be submitted paper) should be clearly denoted, as well as any presentations (completed or scheduled). The student's committee will review the document and give the mentor feedback on the student's progress by Nov. 15<sup>th</sup>. The mentor will communicate these findings to the student both verbally and by email, with the entire committee being copied on the email. The purpose of this update is to give the student feedback on their research and academic standing before the research progress exam in March.

A typical track is generally overviewed below, with more details on each step being found throughout this handbook. See details on each process for situations that do not fit this overview (such as a failing grade on any step). A key part of the transition process is the research progress exam that takes place the same academic year of the written report. This exam is explained in more detail in Section J of this handbook (page 11).



## **B. Admission Details**

The handbook for the Master's program outlines the application procedure, how the admissions process works for those applying to the department for the first time, and typical admission requirements (including TOEFL scores). Please refer to that document for more information on the admissions process. In most cases, students will enter the Ph.D. graduate program in the Department of Chemistry through the Master's program. Students can also enter directly into the Ph.D. program if they already have a M.S. degree from another institution.

Typically, a student entering the Ph.D. program will be coming from our Master's program. In the last semester in the M.A. program (usually year 2), a student needs to start the transfer process into the Ph.D. program. This is not a formality; the student's Master's committee must agree that the student has sufficient background and productivity to warrant this transition. Below is the procedure that must be followed to transition into the Ph.D. from the Master's program.

Students who that would like to be admitted directly into the Ph.D. program (if they already have a M.S. from another institution) will follow the same exam structure that is outlined in this document, after the equivalent of the M.A. coursework has been completed, usually in the 1<sup>st</sup> or 2<sup>nd</sup> year in the program. These students will be handled on a case-by-case basis, with mentoring by the graduate program director.

### **Procedure for Transferring from the Master's Program to the Ph.D. Program**

1. In their 2<sup>nd</sup> year, each M.A. candidate will convene a meeting of their Master's faculty committee (research advisor and two other faculty) to give an oral presentation (minimum 20 minutes) of their research performance to date. The faculty committee will evaluate the student's aptitude and their research performance for the Ph.D. program. This meeting should occur before March 15<sup>th</sup> for all second year Master's candidates wishing to transfer. More details about this exam is found in Section J of this handbook (page 11).
2. The Master's committee will then submit a written recommendation to the Graduate Program Director as to whether or not they recommend the Master's candidate transfer to the Ph.D. Program. See page 12 for an example letter.
3. If the recommendation is positive, the student should then fill out a Petition to Amend Program. The form will be provided by the Graduate Program Director.
4. The Graduate Program Director will verify satisfactory graduate student status and sign the Petition.
5. All students have the right to appeal the decision of the Master's committee and the Graduate Program Director to the Department Chairperson.
6. Once these procedures are complete, the student will be considered part of the Ph.D. program.

A key part of this process is the research progress exam in year 2. This exam is explained in more detail in Section J of this handbook (page 11).

### C. Graduate Student Advising

The normal course for transitioning into the Ph.D. program is through the Master's program. In most cases, the research advisor for the Ph.D. program will be the same as the Master's program. In cases where a student wants to change advisors for the Ph.D., it is expected that the student will identify their research mentor during the first month of their admission to the program. If a new mentor is needed, students will choose a research mentor by interviewing at least 4 research active faculty from both sub-disciplines (Synthesis & Materials Chemistry and Analytical & Physical Methods). After meeting with at least 4 of the research active faculty, they will contact the Graduate Program Director and notify him/her of their top 3 choices for a research mentor. The Graduate Program Director will meet with the faculty mentors to place the student and then notify the student of their assigned research mentor. Again, this is not the common route, as it is expected that there will be no change in mentorship between the Master's and Ph.D. programs. Students entering directly into the Ph.D. program (already having a M.S.) will choose an advisor as described above.

### D. Definition of Full-time Graduate Students

- (a) All enrolled students holding fellowships, teaching, or research assistantships are defined as full time students regardless of hours registered.
- (b) Students who are not on an assistantship and have not yet passed their oral examinations must enroll in 6 or more hours during a regular semester (fall or spring) and 3 or more hours during the summer semester.

### E. Assistantships and Fellowships

For more information, see the graduate education catalog (<http://www.slu.edu/graduate-education/current-students>) and the "*Policies and Procedures Manual for Graduate Assistantships and Fellows*," available in the A&S graduate studies office.

#### (a) *Teaching Assistantships*

Persons holding a teaching assistantship may work with students in small groups, lead group discussions, monitor examinations and grade papers, help prepare lectures, conduct laboratory sessions, or even be responsible for a course as the primary instructor. Under the close supervision of the faculty, the teaching assistant concurrently develops teaching skills and a deeper understanding of the discipline.

In most cases, a 12-month award includes a stipend, a health insurance package for the student (plus the option to purchase family coverage), and a tuition scholarship of 18 hours during the regular academic year and three hours during the summer session. (Summer attendance is also mandatory.) The student is **required** to be in residence the day the assistantship begins. If the student is on a teaching assistantship (commonly referred to as a TA), support for June comes in the form of research support (from the research advisor) or

additional teaching duties over the summer. If a student is coming into the Ph.D. program from another graduate program then the time of residence and length of award may vary.

(i) *Length of Support*

As required by the Office of Graduate Education, the maximum number of years that a graduate student may hold an assistantship is for not more than **five years total**. This includes time for both the Master's and Ph.D. degree. Note that grant-based assistantships contribute to the total number of years of assistantship support allowed.

(ii) *Applicant Qualification*

The final decision on awarding an Assistantship rests with the Office of Graduate Education (by the Associate VP of Graduate Education). The appointment to a Teaching Assistantship will be by contract offered by the Office of Graduate Education to the nominated individual.

(iii) *Criteria for Assignment of Teaching Assistantships*

The Graduate Affairs Committee uses the following criteria in nominating individuals for Teaching Assistantships:

**For students currently holding an Assistantship:**

Graduate students currently with an Assistantship (Teaching or Research) are normally awarded an assistantship the following year, provided the student has not exceeded the years of Teaching/Research Assistantship support described above in part (a) of this section. **However**, the student may fail to receive an assistantship for one of the following reasons:

- *Students with a GPA of less than 3.0 are not eligible for assistantships*
- *Poor teaching evaluations*
- *Inadequate research progress*

Continuation is dependent on good academic standing (minimum of 3.0 GPA). Adequate research progress is also a condition of continuing an assistantship. This includes maintaining research effort expected in a 40 hr min. work week resulting in, or appearing to show promise in 1) a publication in a peer-reviewed journal and/or 2) public presentation of results at a professional scientific conference. Continuation is also dependent upon satisfactory performance of the assigned teaching responsibilities. Teaching evaluations provided by the classroom mentor and undergraduate students will play a primary role in determining whether a Teaching Assistantship is renewed. Based upon evaluations, the Graduate Program Director may recommend that the student not receive Teaching Assistantship the following year. Alternatively, the Graduate Program Director may recommend a course of action that may improve performance of the student as a TA (e.g., enrollment in the Certificate in University Teaching Skills (CUTS) program administered by the Center for Transformative Teaching and Learning (CTTL) or acquisition of a faculty teaching advisor).

- *"Unsatisfactory" rating on the student's progress*

Student progress will be rated each year. An "unsatisfactory" rating may preclude a student from receiving an assistantship renewal and may lead to termination from the program altogether. This includes research progress. It is expected that the student make significant research progress towards their degree. It is the expectation that by the end of the 2<sup>nd</sup> year, the student should have 1 published paper. An unsatisfactory rating may be given if this is not the case and the student's committee feels that the student has made inadequate research progress.

**For incoming students and/or students without a prior Assistantship**

1. English-speaking ability (as determined by the ESL Program). This aspect is required for effective teaching of undergraduate students as part of the Teaching Assistant's duties.
2. Academic standing. Includes undergraduate grade point average (GPA) and Graduate Record Examination (GRE) General Test scores.
3. Letters of reference and any additional materials (publications, presentations, etc.).
4. Students currently enrolled in the graduate program, but not supported by an assistantship, are in competition with the current applicant pool for Teaching Assistantship awards. In other words, that student does not receive priority simply due to being enrolled in the graduate program. However, the committee will solicit a letter from the student's mentor and examine current academic standing to aid in the decision process.

*(iv) Teaching Assistant Duties*

Teaching Assistants will be assigned by the Graduate Program Director and Chairperson of the department to instructional duties in the courses, lectures, and laboratories offered by the department. The appointment is half-time, and teaching duties will not require more than 20 hours per week (thus allowing the student to spend substantial time in laboratory research). The duties will include instructional time in the classroom or laboratory, necessary preparation for class or lab, marking papers, and other instructional activities as required. Teaching Assistants must also arrange for reasonable "office hours" for meeting with undergraduate students, and inform their students of the time and place of office hours. The department will provide a suitable office or other place for Teaching Assistants to meet with their students.

Students who begin their assistantships/fellowships during the summer are required to begin their residence at this time. Students may be assigned teaching responsibilities. Students should contact the Graduate Program Director to arrange their summer schedule as soon as they are notified that they have received an assistantship.

*(v) Teaching Assistantship evaluations*

Semester evaluations are to be completed by both faculty instructors overseeing the Teaching Assistant as well as by students being taught by the Teaching Assistant. All evaluations will be turned in to the department office to be included in the graduate student's file.

(vi) *Graduate Student Orientation*

All teaching assistants are required to attend the Graduate Assistants Orientation at the beginning of the fall semester. Announcements of the time and place will be sent to each new assistant in the summer preceding their first semester at Saint Louis University.

**(b) Research Assistantships**

A research assistant is assigned a range of duties such as library searches, field work, laboratory experiences, and preparation of research proposals and grants so as to gain professional skills in research which complement the student's graduate education.

Research assistantships (RAs) can be for a variety of time periods from 1 month to 12 months and can include a stipend, a health insurance package (plus the option to purchase family coverage), and a tuition scholarship. These RAs are usually assigned at the discretion of the research advisor, as the funding for the RAs come from individual research grants. There are normally no instructional duties associated with appointment to a Research Assistantship. Instead, the Research Assistant is assigned to a faculty sponsor responsible for directing research duties of the student. Unless otherwise indicated, the terms of appointment (including GPA requirements), continuation, and maximum support are the same as for teaching assistantships. Normally, once appointed to a Research or Teaching Assistantship, a student will be eligible for reappointment for the maximum period permitted. However, that support may switch between a Research Assistantship and a Teaching Assistantship in any given semester.

**F. Review of Student Progress**

Each student's progress will be rated by the Graduate Program Director in collaboration with the research mentor yearly. In order to be "satisfactory", ALL requirements below must be met. Students who are deemed unsatisfactory will not be eligible for assistantships.

"Satisfactory"	<ul style="list-style-type: none"><li>○ Maintained <math>\geq 3.0</math> GPA in lecture coursework (neither Intro to Research nor Research Topics count as lecture coursework).</li><li>○ Have no more than 2 grades of B- or below.</li><li>○ Maintained research effort expected in a 40 hr min. work week resulting in, or appearing to show promise in leading to:<ul style="list-style-type: none"><li>○ Publications in peer-reviewed journal and/or</li><li>○ Public presentation of results at a professional scientific conference.</li></ul></li><li>○ Maintained cordial and constructive relationship with primary and secondary mentors.</li><li>○ Fulfilled Teaching Assistant responsibilities (for those on a TA).</li></ul>
"Unsatisfactory"	<ul style="list-style-type: none"><li>○ Cumulative GPA <math>&lt; 3.0</math> in lecture coursework.</li><li>○ More than 2 grades of B- or below.</li><li>○ Clear lack of research ability.</li><li>○ Lack of significant research progress.</li><li>○ Failure to fulfill Teaching Assistant responsibilities.</li></ul>

## G. Academic Requirements

Below is an outline of the program structure. A total of 39 credit hours is required, with 12 hours coming from dissertation research credits. An appropriate coursework track will be developed by the student and mentor and approved by the Graduate Program Director. A portion of these units may be fulfilled from chemistry lecture courses and Introduction to Research courses taken as part of the Master's program at SLU. At the end of this handbook, there is a detailed worksheet that simplifies the courses that are needed for the Ph.D. degree. It is highly suggested that students complete their appropriate worksheet each semester.

### I. Core Curriculum (12 hours)

A core curriculum of 12 hours consisting of two courses from each of two primary focus areas of advanced chemistry:

#### *Synthesis & Materials Chemistry*

We seek to educate students in synthetic methodology in the traditional areas of organic and inorganic chemistry, in addition to multidisciplinary materials synthesis and contemporary techniques of characterization. Courses that satisfy this requirement are:

- CHEM 5160 Advanced Synthetic Chemistry (3)
- CHEM 5400 Organic Spectroscopy (3)
- CHEM 5440 Bioorganic Chemistry (3)
- CHEM 5450 Advanced Organic Chemistry (3)
- CHEM 5460 Synthetic Organic Chemistry (3)
- CHEM 5470 Medicinal Chemistry (3)
- CHEM 5500 Inorganic Chemistry (3)
- CHEM 5550 Organometallic Chemistry (3)
- CHEM 5560 Solid State Chemistry (3)
- CHEM 5590 Special Topics - Inorganic (3)
- CHEM 5800 Fundamentals & Design of Nanomaterials (3)
- CHEM 5850 Polymer Chemistry (3)

#### *Analytical & Physical Methods*

Most of our course offerings here deal with in-depth discussions of analytical techniques, spectroscopic analysis, and physical and theoretical probing of atomic and molecular structure and of chemical processes.

- CHEM 5150 Statistical Methods for Physical Scientists (3)
- CHEM 5170 Advances in Analysis and Modeling of Chemical Systems (3)
- CHEM 5200 Analytical Chemistry 2 (Instrumental Analysis) (3)
- CHEM 5230 Mass Spectrometry (3)
- CHEM 5250 Bioanalytical Methods Analysis (3)
- CHEM 5260 Analytical Separations (3)
- CHEM 5270 Electroanalytical Chemistry (3)
- CHEM 5280 Chemical Sensors (3)

- CHEM 5290 Special Topics - Analytical (3)
- CHEM 5330 Advanced Physical Chemistry (3)
- CHEM 5340 Advanced Thermodynamics (3)
- CHEM 5350 Elements of Surface/Colloid Science (3)
- CHEM 5370 Computational Chemistry (3)
- CHEM 5390 Special Topics - Physical (3)
- CHEM 5450 Advanced Organic Chemistry (3)
- CHEM 5570 Group Theory and Spectroscopy (3)
- CHEM 5620 Biophysical Chemistry (3)
- CHEM 5700 Environmental Chemistry (3)
- CHEM 5800 Fundamentals & Design of Nanomaterials (3)

## **II. Electives (at least 6 hours)**

Must be 6 hrs or more. Most students will take chemistry courses from either area and these must be 5000-level or higher. The electives can also be fulfilled by taking 4000-level or higher courses in other disciplines such as biology, math/computer science, and engineering. This needs to be approved by the student's committee.

## **III. Research Courses (9 hours)**

### **One course from the following (3 credit total, choose 1):**

- CHEM 5299: Introduction to Analytical Research (3 hrs)
- CHEM 5399: Introduction to Physical Research (3 hrs)
- CHEM 5499: Introduction to Organic Research (3 hrs)
- CHEM 5599: Introduction to Inorganic Research (3 hrs)

### **One research topics course (3 credit hours total):**

CHEM 5970: Research Topics

### **One semester of (3 credit hours):**

CHEM 6900 Introduction to Proposal Writing and Oral Presentations

## **IV. Dissertation Credits (12 hours)**

12 total credit hours in Dissertation Research CHEM 6990

## H. Transfer of Credit

If a student wishes to receive credit for graduate coursework at another institution, a “*Petition for Transfer of Credit*” form must be submitted, accompanied by a transcript showing the work, for approval by the mentor or advisor, Graduate Program Director, and Arts and Sciences Associate Dean of the Graduate Education. The grade received must be B or better. Students can transfer a maximum of 6 credit hours of graduate credit to Saint Louis University. It is up to the Graduate Program Director whether the transfer is allowed.

## I. Dissertation Committee

The dissertation committee for each student will consist of a primary research mentor and 4 other members of the Graduate Faculty. These are typically formed in the Fall semester of the student’s first year in the Ph.D. program (typically 3<sup>rd</sup> year in the graduate program).

## J. Examinations

There are 4 examinations for the Ph.D. degree. The first is a research progress exam that typically takes place towards the end of the 2<sup>nd</sup> year in the program. The second is a written comprehensive exam that covers material from coursework. The third is the oral defense of a research proposal, with the fourth and final exam being an oral defense of the research dissertation. Each is discussed below. The dissertation committee (described above in Section I) will be responsible for developing and administering the written and oral comprehensive examinations. The intent of these exams is to determine if the student is prepared to continue their Ph.D. studies.

- i) **Research progress exam.** By Nov. 1 of their 2<sup>nd</sup> year in the program, the student should form a 3-person committee (research advisor and two other faculty) and submit a 2-3 page written document that outlines the student’s research project. The student’s name, committee, and desire to transition into the Ph.D. program should be clearly denoted. This update should include an introduction and an overview of the results obtained to date. Figures may also be included. Any submitted papers (or soon to be submitted papers) should be clearly denoted, as well as any presentations (completed or scheduled). The student’s committee will review the document and give the mentor feedback on the student’s progress by Nov. 15<sup>th</sup>. The mentor will communicate these findings to the student both verbally and by email, with the entire committee being copied on the email. The purpose of this update is to give the student feedback on their research and academic standing before the research progress exam. For students currently in the Master’s program, this exam should occur before March 15<sup>th</sup> of their second year. For students who entered directly into the Ph.D. program (with a M.S. from another institution), this exam should take place by March 15<sup>th</sup> of the calendar year the student wants to start the exam process. This is typically towards the end of their 2<sup>nd</sup> year in the program.

For either case, the student will present their research to the committee in the form of a minimum 20 minute presentation. The faculty committee will evaluate the student’s aptitude and their research performance for the Ph.D. program. It is the expectation that the student

should have progressed to a peer-reviewed publication by the end of their 2<sup>nd</sup> year in the program. If adequate research progress has taken place and the student is in good academic standing, as denoted by coursework GPA and fulfilling TA duties, the student will pass this exam. See the following pages for examples of the committee recommendation letter. In the case of students in the Master's program, they will be allowed to petition into the Ph.D. program and start the comprehensive exams in the August of that calendar year. In the case of students already in the Ph.D. program they will be allowed to start the comprehensive exams in the August of that calendar year.

If the committee decides that the student has not achieved adequate research progress or if there are concerns about the student's academic standing (as denoted by coursework GPA and fulfilling TA duties), the student will have been deemed to fail this exam and not be allowed to continue in the Ph.D. program. In the case of students in the M.A. program, they will not be allowed to transition into the Ph.D. program. The student may choose to write and defend a M.S. thesis or may schedule an oral exam to receive an M.A. degree. For students in the Ph.D. program already, once their assistantship is completed (by May 31<sup>st</sup>), they will no longer be in the program.

The following are examples of the recommendation letter for both scenarios. This letter will be signed by the student's committee and given to the Graduate Program Director.

**For students in the Master's program and wanting to transition into the Ph.D. program**

*If it is agreed that the student should be allowed to petition into the Ph.D. program*

To: Dana Baum, Ph.D.  
Graduate Program Director  
Department of Chemistry

This letter is to certify that XXX YYY's committee met on DATE in order to receive an update on *his/her* research progress and to determine if *he/she* should be allowed to petition into the Ph.D. program. The decision of the committee was that *he/she* is progressing very well in research and coursework and the committee supports the petition to transition into the Ph.D. program.

\_\_\_\_\_ XXX (research advisor and committee member)

\_\_\_\_\_ YYY (committee member)

\_\_\_\_\_ ZZZ (committee member)

If it is agreed that the student should NOT be allowed to petition into Ph.D. program:

To: Dana Baum, Ph.D.  
Graduate Program Director  
Department of Chemistry

This letter is to certify that XXX YYY's committee met on DATE in order to receive an update on *his/her* research progress and to determine if *he/she* should be to petition into the Ph.D. program. The decision of the committee was that *he/she* is not progressing as expected in either research or coursework and the committee does not support the petition to transition into the Ph.D. program.

\_\_\_\_\_ XXX (research advisor and committee member)

\_\_\_\_\_ YYY (committee member)

\_\_\_\_\_ ZZZ (committee member)

**For students already in the Ph.D. program (coming in with M.S. from another program)**

If it is agreed that the student should be allowed to stay in program and start the comprehensive exams

To: Dana Baum, Ph.D.  
Graduate Program Director  
Department of Chemistry

This letter is to certify that XXX YYY's committee met on DATE in order to receive an update on *his/her* research progress and to determine if *he/she* should be allowed to stay in the Ph.D. program and take the comprehensive exams. The decision of the committee was that *he/she* is progressing very well in research and coursework and the committee supports the student taking the comprehensive exams.

\_\_\_\_\_ XXX (research advisor and committee member)

\_\_\_\_\_ YYY (committee member)

\_\_\_\_\_ ZZZ (committee member)

If it is agreed that the student should NOT be allowed to stay in program

To: Dana Baum, Ph.D.  
Graduate Program Director  
Department of Chemistry

This letter is to certify that XXX YYY's committee met on DATE in order to receive an update on *his/her* research progress and to determine if *he/she* should be allowed to stay in the Ph.D. program and take the comprehensive exams. The decision of the committee was that *he/she* is not progressing as expected in either research or coursework and the committee does not support the student taking the comprehensive exams and remaining in the Ph.D. program.

\_\_\_\_\_ XXX (research advisor and committee member)

\_\_\_\_\_ YYY (committee member)

\_\_\_\_\_ ZZZ (committee member)

**ii) Written Exam.** The written exam will be taken in the Fall semester of the student's first year in the Ph.D. program (typically 3<sup>rd</sup> year in the graduate program). These exams will be given at or around August 15<sup>th</sup> (exact date will be communicated by the graduate program director). The student will either take the Analytical, Physical, Organic, Inorganic, or Biological Chemistry written exam depending on their area of research interests. To prepare for these exams, the student should take CHEM 6990 Dissertation Research for 3 credit hours the summer before the exam and use part of the summer to prepare for the exam.

The written exam will serve to verify that the candidate has developed the ability to synthesize information across the field and show the expected level of knowledge in the relevant discipline(s). The exam consists of 2 parts and will be taken over the course of one day. Part I will cover basic topics of each discipline, generally topics that are covered in an undergraduate curriculum. Part II will cover more advanced topics that a student encountered during the graduate coursework. Details about the exam will be provided to students the summer before the exam.

If a student fails the written exam, they will be given the chance to re-take the exam within ~1 month after the first exam. This should be done at or around September 15<sup>th</sup> (exact date will be communicated by the graduate program director). Even if the student fails the first exam, they are required to take CHEM 6900 and the dates for the research proposal do not change (see next section). If the student fails the 2<sup>nd</sup> exam, they will have officially failed the written examination and are not allowed to continue in the Ph.D. program.

**iii) Oral Defense of Research Proposal.** The purpose of the oral exam will be to afford the candidate an opportunity to present and defend their Ph.D. Dissertation Research Proposal.

The student must pass the Oral Defense of the Dissertation Research, administered by the dissertation committee, following the requirements of the Office of Graduate Education.

Students should first register for CHEM 6900 (Introduction to Proposal Writing and Oral Presentations) in the Fall of their first year in the Ph.D. program (typically 3<sup>rd</sup> year of the graduate program). During CHEM 6900, they will be asked to develop their dissertation committee and their research proposal. This proposal will outline the subject of their research, major goals of the proposed work, a suggested experimental approach, and a timeline for completion of the project. Detailed instructions for the format are provided in the CHEM 6900 course. By the end of the course, a complete version of the research proposal will be submitted to the faculty mentor.

This course is graded S (satisfactory) or U (unsatisfactory). All of the course requirements must be completed to receive an S grade. If a student is assigned a U grade, they will have administratively failed their first try at the oral exam. As explained below, they have one additional opportunity to pass this exam but only after they successfully complete the course (the timelines below still hold true for this situation).

The first draft of the proposal is due to the faculty mentor by the end of the CHEM 6900 course, with the final draft being due to the committee by January 15<sup>th</sup>. The student should schedule and complete an oral defense of this proposal by March 1<sup>st</sup> of the student's 1<sup>st</sup> year in the Ph.D. program (typically 3<sup>rd</sup> year of the graduate program). The student must fill out a Doctoral Oral Examination Form at least 2 weeks prior to the exam. The form can be found at: [http://www.slu.edu/Documents/graduate/graduate\\_education/Doc Oral Exam Form.pdf](http://www.slu.edu/Documents/graduate/graduate_education/Doc_Oral_Exam_Form.pdf). *Students should also sign up for CHEM 6950 during the semester they take their oral exam (spring of their first year in the Ph.D. program).* The student will receive an S grade if they successfully pass the exam.

If the student does not schedule and complete their defense by March 1<sup>st</sup>, they administratively fail the exam. If the student does not pass their oral defense on the first try, they have one additional opportunity to take the exam. This 2<sup>nd</sup> exam must be completed by April 15<sup>th</sup>. If the student fails the 2<sup>nd</sup> exam, they will have officially failed the oral examination and are not allowed to continue in the Ph.D. program.

Pending a successful outcome in both written and oral exams the student, the student is advanced to the status of Candidate.

**a) Detailed Procedure for Oral Defense**

1. The student will submit their research proposal to their 5-person committee by January 15<sup>th</sup>. The student will also schedule a defense date/time as well as a room for the defense. At least a 2-hour time block should be scheduled. The defense should occur no later than March 1<sup>st</sup>.
2. The student will present their research proposal to their 5-person committee. The student should make no more than 8-10 slides for this presentation. The presentation should include background material and the basics of each aim.

3. For the purposes of this exam, the faculty mentor will not lead the exam. The exam will be led by another faculty member (identified beforehand by the student and mentor) who has an area of expertise that overlaps with the proposed research. This faculty member shall serve as the oral defense moderator.
4. The moderator will chair the session, lead the questioning, and ensure that forms are filled out.
5. The faculty mentor can ask questions of the student but the mentor cannot answer any questions of other faculty or the student. When not asking questions, the mentor should remain silent during the exam.
6. After all committee members are satisfied with the questioning period, the student will be asked to leave the room. There should be a discussion about the student's performance.
7. The options for rating the student's performance are: pass, pass with conditions, or fail. If conditions are required, they should be clearly communicated to the student and denoted on the form by each committee member. If the student fails, they get 1 additional opportunity to take the oral exam. This 2<sup>nd</sup> exam must be completed by April 15<sup>th</sup>. If the student fails the 2<sup>nd</sup> exam, they will have officially failed the oral examination and are not allowed to continue in the Ph.D. program.

**iii) Dissertation.** Upon completion of the oral and written examinations, the student is advanced to the status of Candidate. Doctoral students anticipating degree conferral at University Commencement ceremonies in May should formally become Candidates before the end of the preceding Fall Semester.

Once the candidate and the faculty mentor feels that the research is near completion and it is appropriate to schedule a defense, the candidate should call an informal meeting of the dissertation committee. *This should be done 6-months prior to the desired defense date.* The purpose of this meeting is for the candidate to update the committee on recent research progress and for the committee to give the candidate approval on scheduling a defense. This should be a ~20 min presentation that gives an overview of the dissertation, progress made since the oral defense and any changes to the aims that were presented in the oral defense. After this approval is granted, the candidate should schedule a public defense. They must also fill out the Notification of Readiness for the Public Oral Presentation of the Ph.D.

Dissertation found at

[http://www.slu.edu/Documents/graduate/graduate\\_education/Notification\\_of\\_Readiness.pdf](http://www.slu.edu/Documents/graduate/graduate_education/Notification_of_Readiness.pdf).

The ability to extend the knowledge base in the major field is a qualification distinctive to the Ph.D. degree. A Candidate for this most advanced degree must present substantial evidence of this ability by presenting and defending a piece of original and independent research on a topic of importance that has been previously unresolved within the major field.

Students in the research phase of their Ph.D. must formally enroll to accumulate credit hours of Dissertation Research in a manner not unlike that for coursework taken. Twelve semester hours of Dissertation Research are required of each student pursuing the Ph.D. Only after accumulating the total semester hours required may the student register for zero Dissertation Research credit.

*Public Presentation and Defense of the Dissertation:* Across all major fields, Graduate Education requires a public, oral presentation and defense of the dissertation. The presentation should be scheduled after all Graduate Faculty readers have approved the general content of the dissertation. This is general done at the committee meeting *6 months prior* to the desired defense date (see preceding section).

A Notification of Readiness form and a final draft paper copy of the dissertation with the abstract (for format review) must be submitted to the Doctoral Candidacy Advisor well in advance (minimally 6 weeks) of the presentation date. Candidates anticipating May graduation must submit the aforementioned materials no later than the date set in the Graduate Program's supplement of the University Calendar. It is the Candidate's responsibility to contact the Chemistry Department's Administrative Secretary to post flyers stating the date, time, and location of the public oral presentation.

Following the presentation, the Candidate should expect questions from the readers and the assembled audience. The dissertation-committee chairperson serves as the moderator for the defense. At the conclusion, the readers may evaluate the performance of the Candidate, but the dissertation ballots are not signed individually until each committee member fully approves the dissertation.

*Publication of the Dissertation:* Graduate Education requires submission to the Doctoral Candidacy Advisor copies of the final version of the dissertation through ProQuest. The student should also get a bound copy to the department and their advisor. More information about publication of the dissertation can be found in the graduate education catalog: <http://www.slu.edu/graduate-education/current-students>.

## **K. Procedures for Academic Appeals**

If a graduate student wishes to appeal any academic decision in the College of Arts and Sciences (CAS), that appeal should first be made to the faculty member or faculty involved and, if necessary thereafter, to the department chairperson or program director if the program has no chair. The initial appeal must be made within 30 days after the academic decision was communicated or made available to the student. If the appeal is carried forward to the department chairperson or program director, this must be done within 30 days of the faculty's decision. The department chair or program director reviews the materials and either supports the instructor's recommendation or determines an appropriate outcome.

Should the student wish to continue the appeal process, the next step involves the Board of Graduate Education (BGE) of the College of Arts and Sciences. An appeal to the BGE must be made in writing and submitted to the Associate Dean for Graduate Education within 30 days of the decision by the department chairperson or program director. The Associate Dean will notify all parties involved of the appeal and will provide both parties an opportunity to submit any supporting documentation they believe the BGE should review. Written submissions will be limited to 10 pages, with additional appendices if necessary, from each side in the dispute. The appeal may be heard as an agenda item at one of the regularly scheduled BGE meetings, or a special meeting may be called. A quorum of the BGE, excluding ex-officio members, must be in

attendance. When the BGE sits as appeals board, a graduate student selected by the Graduate Student Association will be appointed to the board as a voting member. This student must be a graduate student in the College of Arts and Science but not from any departments involved in the appeal. Since this is an internal and not a legal procedure, students involved in the appeals process may be accompanied by someone who is not acting as an attorney or representing the student in his/her capacity as an attorney. If a member of the BGE is a member of the department or program involved in the appeal, that BGE member will abstain from active participation in the appeals process. The Associate Dean for Graduate Education shall be present throughout the entire process, but shall not be allowed to propose or second any motion, or to cast a vote on any motion related to the appeal.

The BGE will hear the case presented by the student and others supporting the student's appeal and will also hear the presentations of the other parties involved. Then, the BGE will conduct a discussion. If the BGE finds that insufficient information has been presented, it may request a period of not longer than 30 days to obtain the information, meet again, and reach a decision. The BGE will consider the merits of the student's appeal and the adequacy of procedures followed in the department. The BGE may support the decision being appealed, overturn it, or change the penalty imposed. The Associate Dean will inform the student in writing of the BGE's decision.

Should the student wish to appeal the decision beyond CAS, a written appeal may be submitted to the Associate Vice President for Graduate Education. This must occur within 30 days of the decision by the BGE. The AVP will review the documents as submitted to the BGE and may request additional information to determine whether or not the process as outlined in this section was appropriately followed. The AVP cannot overturn a decision but can remand the decision back to CAS for further investigation if the process was not followed.

### **Worksheet for Ph.D. in chemistry (research-based)**

A total of 39 credit hours will be required with 12 hours coming from dissertation research credits. An appropriate coursework track will be developed by the student and mentor and approved by the Graduate Program Director. *Note:* a portion of these units are fulfilled by lecture courses and Introduction to Research courses taken as part of the Master's program at SLU.

### **To be completed PRIOR to transitioning into Ph.D. program**

**Core curriculum (12 hrs):** A core curriculum consisting of 2 courses from each of the 2 primary focus areas (6 hrs from each area)

#### **1. Synthesis & Materials Chemistry**

**CHEM 5160** Advanced Synthetic Chemistry (3)  
**CHEM 5400** Organic Spectroscopy (3)  
**CHEM 5440** Bioorganic Chemistry (3)  
**CHEM 5450** Advanced Organic Chemistry (3)  
**CHEM 5460** Synthetic Organic Chemistry (3)  
**CHEM 5470** Medicinal Chemistry (3)  
**CHEM 5480** Heterocyclic Chemistry (3)  
**CHEM 5500** Inorganic Chemistry (3)  
**CHEM 5550** Organometallic Chemistry (3)  
**CHEM 5560** Solid State Chemistry (3)  
**CHEM 5590** Special Topics - Inorganic (3)  
**CHEM 5800** Nanomaterials (3)  
**CHEM 5850** Polymer Chemistry (3)

#### **2. Analytical & Physical Methods.**

**CHEM 5150** Statistics for Chemical Research (3)  
**CHEM 5170** Advances in Analysis and Modeling of Chemical Systems (3)  
**CHEM 5200** Analytical Chemistry 2 (3)  
**CHEM 5230** Mass Spectrometry (3)  
**CHEM 5250** Bioanalytical Methods (3)  
**CHEM 5260** Analytical Separations (3)  
**CHEM 5270** Electroanalytical Chemistry (3)  
**CHEM 5280** Chemical Sensors (3)  
**CHEM 5290** Special Topics - Analytical (3)  
**CHEM 5330** Advanced Physical Chemistry (3)  
**CHEM 5340** Advanced Thermodynamics (3)  
**CHEM 5350** Colloids and Interfacial Chem (3)  
**CHEM 5370** Computational Chemistry (3)  
**CHEM 5390** Special Topics - Physical (3)  
**CHEM 5450** Advanced Organic Chemistry (3)  
**CHEM 5570** Group Theory and Spectroscopy (3)  
**CHEM 5620** Biophysical Chemistry (3)  
**CHEM 5630** Chemical Biology and Biotechnology (3)  
**CHEM 5700** Environmental Chemistry (3)  
**CHEM 5800** Nanomaterials (3)

List 2 of the courses (course #) you have taken from in the synthesis/materials core:

1) \_\_\_\_\_ 2) \_\_\_\_\_ (6 hrs)

List 2 of the courses (course #) you have taken from in the analytical/physical methods core:

1) \_\_\_\_\_ 2) \_\_\_\_\_ (6 hrs)

**Chemistry Electives:** must be 6 hrs or more. List the other chemistry courses you have taken along with the total # of hrs. Most students will take chemistry courses and these must be 5000-level or higher. The electives can also be fulfilled by taking 4000-level or higher courses in other disciplines such as biology, math/computer science, and engineering. This needs to be approved by the student's committee.

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_ (other classes, if needed)

# of chemistry elective hrs \_\_\_\_\_ (should be 6 or more hrs)

**Introduction to Research.** You must take an introductory to research course (3 hrs). Note that this can only be taken once (choose one). It is recommended this course be taken during the first year of graduate studies.

CHEM 5299: Introduction to Analytical Research (3 hrs)

CHEM 5399: Introduction to Physical Research (3 hrs)

CHEM 5499: Introduction to Organic Research (3 hrs)

CHEM 5599: Introduction to Inorganic Research (3 hrs)

List the course you have taken: \_\_\_\_\_ (can't be more than 3 hrs)

**Research Topics:** A research topics course must be taken during the summer between the 1<sup>st</sup> and 2<sup>nd</sup> year in the program for 3 credit hours.

CHEM 5970 Research Topics (3 hrs) \_\_\_\_\_ (can't be more than 3 hrs)

**Special Study for Examinations.** You should sign up for CHEM 5950 for 0 credit hours in the semester you wish to transition, typically Spring of the 2<sup>nd</sup> year.

Semester that CHEM 5950 was taken \_\_\_\_\_ # hrs \_\_\_\_\_ (must be 0)

**To be completed AFTER transitioning into Ph.D. program**

**Proposal Writing Course:** Take one semester of the CHEM 6900 Introduction to Proposal Writing and Oral Presentations (3 credit hours). This should be taken in the first semester of the Ph.D. program.

Semester that CHEM 6900 was taken \_\_\_\_\_ # hrs \_\_\_\_\_ (should = 3 hrs)

**Special Study for Examinations.** You should sign up for CHEM 6950 for 0 credit hours in the semester you will defend your research proposal (usually spring semester of 3<sup>rd</sup> year in the graduate program).

Semester that CHEM 6950 was taken \_\_\_\_\_ # hrs \_\_\_\_\_ (must be 0)

**Dissertation Research (12 hours).** You should take 12 hrs of dissertation research (CHEM 6990). These are graded IP (in progress) until your last semester, where an S or U grade is assigned.

Semesters that CHEM 6990 was taken:

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_ 4) \_\_\_\_\_ # hrs \_\_\_\_\_ (should = 12 hrs)

**Total # of hrs \_\_\_\_\_ (should be 39 or more)**