Integrated & Applied Sciences

Saint Louis University

Handbook

for

Ph.D. Studies

2018 - 2019

Approved by Integrated & Applied Sciences Administrative Committee
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Graduate Programs – Integrated & Applied Science
Saint Louis University

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A. General

(1) Mission Statement

The last two decades have seen a significant increase in emphasis on interdisciplinary approaches within the scientific community and current students graduating with a Ph.D. will need to be skilled in the art of collaboration. The Integrated and Applied Sciences Ph.D. program was established to broaden student exposure to all areas of science, encourage collaboration across departments and colleges, and to better train graduate students to present their research to a more diverse audience. This interdisciplinary program is large enough to provide students with broad exposure to collaborative scientific projects, yet is small enough for students to have the one-on-one interaction with their faculty mentor that is necessary to develop the communication skills that will enhance their employment opportunities and, in keeping with our Jesuit tradition, endow students with the tools to better contribute to society.

(2) Degree Program Overview

The Integrated and Applied Sciences Ph.D. program exists within the framework of the University and the College of Arts & Sciences. Our program is governed by the rules and requirements contained in the current edition of the Graduate Education Catalog, which can be found on the Graduate Education website (http://www.slu.edu/x52519.xml). The Integrated and Applied Sciences (IAS) Program is administered by a Program Coordinator assigned from faculty in the College of Arts and Sciences. The program allows participation by any science faculty member at SLU provided they have external funding to support their graduate student(s), the ability to get Graduate Faculty standing, and the approval of their Department Chair or Center Director.

The Integrated and Applied Sciences program offers a research-intensive Ph.D. degree with emphasis in specific tracks given by the appointment of the primary mentor. Those tracks are given below and detailed in section G. The majority of the coursework will be in the discipline-specific department, although students are required to take courses in other departments as well as courses specific to the Integrated and Applied Sciences program. Details on the specific degree requirements can be found in section D.

(3) Discipline-specific Concentrations Offered by Participating Departments

(i) Chemistry (Department of Chemistry)
(ii) Biology (Department of Biology)
(iii) Environmental Sciences & GIS (Department of Earth & Atmospheric Sciences)
(iv) Physics Nanomaterials and Condensed Matter (Department of Physics)

B. Admission

(1) Procedure

Applicants for the Integrated and Applied Sciences Ph.D. program must submit a formal application through the online Graduate Admissions portal. The admission requirements and procedures are detailed in the Graduate Education Catalog. After a completed application is submitted to Graduate Admissions, the application will be released to the IAS program coordinator, who will forward the

application to the proposed IAS faculty primary mentor. The primary mentor is responsible for notifying the program coordinator to confirm that funding is in place to support the student. If funding is sufficient, the program coordinator will forward the application to the IAS administrative committee for review.

(2) Application Requirements

Admissions to the Integrated and Applied Sciences (IAS) Program will be on a rolling basis. The application must include:

a) a completed electronic application with application fee
b) official transcripts from all colleges and universities attended. If the college or university is located outside the US, an external equivalency evaluation from a company like ECE (www.ece.org) is required.
c) three letters of recommendation
d) a curriculum vitae
e) a professional goals statement identifying at least one (but up to 3) IAS faculty that the student would like to be mentored by
f) GRE scores are not required for admission, but may be submitted if desired
g) TOEFL or IELTS scores for international students from countries where English is not the primary spoken and written language.

(3) Prerequisites for Admission

The IAS administrative committee will ensure that the applicant possesses a minimum of a baccalaureate degree from an accredited, recognized college or university in a discipline relevant to the research of the primary mentor, along with a passing score on the TOEFL(80)/IELTS(6.5), if applicable. A primary mentor must be identified and must have agreed to accept and support the student financially.

(4) Program Admission Requirements

The IAS administrative committee will ensure that the applicant's previous academic record indicates the ability needed to pursue advanced studies. The IAS administrative committee (through the program coordinator) will then make an admissions recommendation to the Arts & Sciences Associate Dean for Graduate Affairs who provides the final approval. Notification of admission is issued by the Office of Graduate Education.

(5) Graduate Student Advising

All new students must have already identified a primary mentor, as that mentor is responsible for obtaining financial support for the student (see section B(1)). During the second (but no later than the third) semester in the Ph.D. program, students are expected to also choose a secondary mentor from a different department or discipline to that of the primary mentor. The primary mentor, secondary mentor, program coordinator and the IAS administrative committee will be available for advising students on their course schedules, committee formation, and other appropriate matters. Until a dissertation proposal committee is formed, the primary mentor and secondary mentor will be responsible for advising the student on research matters. See sections B(8) and C(2) for additional

information about the dissertation proposal committee.

(6) Definition of Full-time Graduate Students

- All enrolled students holding assistantships or fellowships are defined as full time students regardless of hours registered.
- Students who are not on an assistantship or fellowship and have not yet passed their written and oral examinations must enroll in 6 or more hours during a regular semester (fall or spring) to maintain full-time status.
- Students who have completed coursework and are enrolled solely in Dissertation Research (6990) are classified as full-time students regardless of hours registered.

(7) Continuous Registration

Graduate students are required to be enrolled every fall and spring semester until the degree is conferred. Students who are awarded 11-month assistantships are also required to register for the summer semester.

(8) Selection of Primary and Secondary Mentors and Dissertation Committee

The primary mentor must have funding to support the graduate student. They must also have graduate faculty standing and Ph.D. mentoring status as determined by their home department. It is expected that all new students will have already identified a primary mentor, as that mentor is responsible for obtaining financial support for student. During the 2nd semester (but no later than the 3rd semester) in the Ph.D. program, students are expected to also choose a secondary mentor. While the primary mentor will serve as the main director for their graduate student's research project, the secondary mentor will also play an important role in the direction and research advising of the student. The secondary mentor will meet with the primary mentor and graduate student to collaborate on experimental design and planning as well as subsequent implementation. Such collaboration enables the fostering of interdisciplinary relationships between participating programs and will be viewed as critical to the success of the overall program. The secondary mentor may or may not provide funding for the student. The secondary mentor may also direct the student's work through an *Interdisciplinary Research* course. Prior to candidacy (during the 3rd or 4th semester), the student will select a dissertation proposal committee composed of a minimum of 5 faculty members, including the primary mentor and secondary mentor. All committee members must hold graduate faculty status. Qualified non-SLU personnel may serve on dissertation committees with written approval from the Associate Dean for Graduate Affairs in the College of Arts & Sciences. See section C(2) for additional information about the dissertation proposal committee.

(9) Review of Student Progress

The primary mentor is responsible for direct oversight of the student's research project and coursework plans. The secondary mentor will perform a unique function for students involved in this interdisciplinary program. Although the secondary mentor represents a different discipline than the primary mentor, they may be directly involved in experimental design, data interpretation, and data analysis for the student's research. The student will meet with the secondary mentor at least once a semester to discuss coursework options and research progress.

At the end of each calendar year, the student is required to submit a mandatory Annual Report to their primary mentor. An example of the report form may be found in section H. Students must request an electronic copy from the program coordinator that is to be completed electronically and returned by email. The student's progress will be rated by their primary mentor (in consultation with the secondary mentor if assigned) as either 'satisfactory' or 'unsatisfactory'. Ratings are defined by the following criteria:

'Satisfactory'	○ Cumulative GPA of ≥ 3.
	○ Maintained expected research effort resulting in, or appearing to show promise in leading to:
	  ○ Publication in a peer-reviewed journal and/or
	  ○ Public presentation of results at a professional scientific conference.
	○ Maintained cordial and constructive relationship with primary and secondary mentors.

'Unsatisfactory'	○ Cumulative GPA < 3.0 in coursework. ○ Clear lack of research ability. ○ Lack of significant research progress. ○ Failure to take preliminary doctoral candidacy exams in a timely manner. ○ Failure to pass either Written Comprehensive or Oral preliminary exams. ○ Failure to form Dissertation/Thesis Committee. ○ Failure to fulfill Assistantship responsibilities.

The completed Annual Report for the calendar year (Jan-Dec) must be forwarded to the program coordinator by January 30 of the following year. If a rating of 'unsatisfactory' is returned, students and their primary mentor and secondary mentor should arrange to meet briefly with the Program Coordinator within 2 weeks of submission of the Annual Report so that a written plan for improvement can be prepared. An unsatisfactory rating on two successive Annual Reports may result in dismissal from the program.

Once formed, the student will be required to formally meet with their dissertation proposal committee once a year, typically in the weeks following submission and receipt of the Annual Report (ie. in the Spring semester). It is the responsibility of the student to arrange the date, time and location for the meeting with each member of the dissertation proposal committee. The Annual Report will be made available to all members of the committee prior to the meeting. The student must summarize recent research developments with respect to objectives laid out in the pre-candidacy dissertation proposal oral exam, typically in the form of a Powerpoint presentation. The meeting will be chaired by the primary mentor, who will relay assessment of the student's progress to the Program Coordinator via email at the conclusion of the meeting. If the student is in their final semester and preparing to defend their Ph.D. dissertation, this annual review meeting should still occur though no later than 3 months prior to the final defense date. The student should briefly outline the content of their dissertation defense. The main purpose of this meeting will be to determine whether the student is fully prepared to undertake their dissertation defense.

C. Graduate Committee Structures

(1) Administrative committee.

The IAS Program Coordinator will be head of the administrative committee. Initially the administrative committee will be comprised of an additional 4 faculty members that represent contributing academic units participating in the IAS Program (Chemistry, Biology, Physics, and EAS), with 2 faculty being the maximum number that can come from one department. In the future, the number of faculty on the administrative committee may be expanded. The Program Coordinator, working with the administrative committee, will provide primary oversight for the program. The Program Coordinator will be in charge of student recruiting, budgetary issues, and awarding of travel funds. The Program Coordinator will also be the primary liaison between the program and the Graduate Education Program in Arts & Sciences, and shall report to Associate Dean for Graduate Affairs.

As described below in the Admissions section, the Program Coordinator and the administrative committee are key in the admissions process. This body will also be charged with developing and implementing student recruiting mechanisms. The administrative committee will be responsible for keeping the program current. This involves the development of new tracks and the recruiting of new participating faculty. The administrative committee will also be responsible for all policy making decisions involving implementation of the academic program consistent with the policies of the Graduate Education Program at Saint Louis University. This may include deciding any disputes concerning oral or written exams, removal of students who do not pass the written or oral exams, any exceptions to the admissions procedure, or exceptions to academic requirements. The administrative committee will determine acceptable ranges for assistantship stipends and approve any exceptions. Finally, the administrative committee will interface with chairs of participating departments to delegate faculty members responsible for teaching courses specific to the IAS program.

(2) Comprehensive Written Exam Committee

The Comprehensive Written Exam is administered each year (as needed) by the IAS Program Coordinator (see section D for more information about the exam itself). The Comprehensive Written Exam Committee is made up of 3 committee members that have either instructed the student in a class or can ask questions that represent the student's previous coursework. One of these members must represent coursework taken outside of the student's primary department to test the interdisciplinary training of the student. Both the primary mentor and secondary mentor are eligible to be on the comprehensive written exam committee. Prospective comprehensive written exam committee members should be solicited directly by the student (in consultation with the primary mentor) and declared to the Program Coordinator before the beginning of the semester in which the Comprehensive Written Exam is to be taken.

(3) Dissertation Proposal Committee

The dissertation proposal committee for each student will consist of the primary mentor, the secondary mentor, and 3 other members of the Graduate Faculty (giving a total of 5 graduate faculty members). Up to one external (non-SLU) faculty member is permitted to be on the dissertation proposal committee with appropriate permission from Arts & Sciences Graduate Education Program . The dissertation proposal committee will be responsible for oversight of the student's research development

through candidacy and will be responsible for administering the precandidacy Dissertation Proposal Oral Exam. See Section D for more information concerning the oral examination and the dissertation defense. Prospective dissertation proposal committee members should be solicited directly by the student (in consultation with the primary mentor and secondary mentor) and declared to the Program Coordinator prior to the scheduling of the Comprehensive Written Exam. A completed Doctoral Oral Examination Form to set up the dissertation proposal committee and pre-candidacy Dissertation Proposal Oral Exam must be submitted to the Doctoral Candidacy Advisor no less than 10 days prior to the proposed exam date. This form may be found on the Graduate Education website.

(4) Dissertation Defense Committee

The dissertation defense committee may comprise exactly the same 5 graduate faculty members as the dissertation proposal committee. Members shall fulfill the role of dissertation readers and shall oversee the final public presentation and dissertation defense oral exam. Should any dissertation proposal committee faculty member withdraw and no longer be available, they may be replaced with permission from the Program Coordinator. At least 3 voting members of the dissertation defense committee (including the primary mentor and secondary mentor) must be present at the oral exam to render a final decision, thus allowing for 2 dissertation proposal committee members to withdraw without being replaced.

D. Degree Requirements

The Ph.D. degree requires a minimum of 42 hours of postbaccalaureate credit. At least 80% of total course credits must be completed in residence. The University requires that students complete the Ph.D. program within 8 years if entering from a baccalaureate and within 7 years if entering from a completed Master's degree program.

The requirements for the Ph.D. degree include:

- A minimum of 30 hours of post-baccalaureate coursework (exclusive of dissertation credits);
- 12 hours of Dissertation Research (IAS 6990);
- Passing of pre-candidacy Comprehensive Written and Dissertation Proposal Oral Examinations;
- A dissertation;
- A public, oral presentation and dissertation defense.

(1) Entering BA or BS Students

(a) Coursework

The exact distribution of courses in the various areas should be developed and determined by the student in consultation with their primary mentor, secondary mentor and the Program Coordinator with a minimum total of 30 credit hours between all lecture and laboratory coursework areas. A total of 42 credit hours will be required with the remaining 12 credit hours coming from dissertation credits. Some portion of these units may be fulfilled from the appropriate MS program taken at SLU or elsewhere (and governed by the Graduate Education rules for importation of credit hours).

I. Participating Departmental Core Courses (in department where research is performed)

9-12 Credit Hours

Students will take 3-4 lecture or laboratory-based courses in addition to departmental Seminar courses taken at the 5000 and 6000 level within one of the participating departments in the IAS Program. A maximum of 10 credits of 4000-level courses may be taken in accordance with Graduate Education rules. Three credit hours of Introduction to Research coursework in each of the sub-disciplines of the student's choice may also be included. Section F provides a summary of course offerings in the various tracks.

II. Interdisciplinary Credits

18-21 Total Credit Hours

(i) Students will choose 2-3 courses from a department outside of their core department. These may be taken from:

- Chemistry
- Earth & Atmospheric Sciences
- Engineering
- Physics
- Mathematics and Computer Science
- Biology
- Biomedical Sciences
- Public Health
- Research Methodology
- Center for Sustainability
- GIS courses

Because the IAS program is flexible and in a constant state of growth, coursework from other science programs may be considered and indeed new tracks developed by the IAS students in consultation with faculty mentors, the IAS administrative committee and Graduate Education.

(ii) Interdisciplinary Seminar, IAS 6010 (4 credit hours)

(iii) Current Topics in Interdisciplinary Research, IAS 6030 (8 credit hours)

(iv) Interdisciplinary Research Credits (0-3 credit hours)

An interdisciplinary seminar course, IAS6010 Interdisciplinary Seminar (1 credit hour per semester), will be taken for 4 semesters during the 2nd and 3rd years of the program. This will involve attendance at research seminars in the student's primary department, in addition to research seminars in programs of the student's secondary area of interest. Additionally, students will take IAS6030, 'Current Topics in Interdisciplinary Research' (2 credit hours per semester), typically concurrent with IAS 6010 enrollment where students will investigate and discuss the current scientific literature across the various disciplines. Both these courses will feature lectures and discussion across disciplinary boundaries. Students will also be encouraged to become actively engaged in interdisciplinary research outside their

particular field of specialization, especially if it relates to their own research project. This may involve enrollment in a research course for a semester in the department or program of their secondary mentor, if one is available.

III. Dissertation Credits:

12 total credit hours in Dissertation Research, IAS 6990 under the section number of their primary mentor.

IV. Total Credit Hours:

42 total credit hours will be the minimum required to fulfill the degree requirements.

(b) Advanced Standing

If a student wishes to receive credit for graduate coursework completed in a degree program at another institution, a petition for Evaluation of Advanced Standing must be submitted, accompanied by a transcript showing the work, for approval by the primary mentor, Program Coordinator, and Associate Dean for Graduate Affairs. The grade received must be B or better. The petition form may be found on the Forms and Petitions page of the Graduate Education website.

(c) Selection of Primary and Secondary Research Mentors, Change of Concentration

A primary research mentor (primary mentor) in the IAS concentration of interest to the student is selected during the application process. This is in part due to the financial support mechanism for the IAS program. Thus students will have typically identified their research mentor during this process prior to enrollment in their first semester of graduate studies at SLU. By the end of the 2nd semester (and no later than the end of the 3rd semester), a secondary mentor in a collaborating department will be identified by the student and primary mentor and declared to the IAS AC. The secondary mentor will perform a unique function for students involved in this interdisciplinary program. The secondary mentor will be a member of a different discipline than the primary mentor, yet they may be directly involved in the experimental design and data interpretation and analysis. The secondary mentor may or may not provide funding for the student. The secondary mentor may also direct the student's work through a research course in their home department (Section D(1)(a)II(iv)).

A decision to change either primary mentor or secondary mentor should not be taken lightly. A change of primary mentor in particular should only be considered if a new faculty member has been identified with financial support for the student in place. Given this support, permission to change primary mentor must be sought from the Program Coordinator and IAS AC. A change in concentration that may result from a change in primary mentor must be made by a formal petition to the Associate Dean of Graduate Education to change the degree program. The form for the *Petition to Amend the Graduate Program* may be found on the Forms and Petitions page of the Graduate Education website.

(d) Pre-candidacy Examinations

Candidates for the IAS Ph.D. degree must submit to two forms of pre-candidacy examination in compliance with the requirements of the Graduate Education Program. A student may advance to candidacy (and enroll for dissertation hours) for the Ph.D. degree only after successful completion of

both written and oral preliminary examinations. The Comprehensive Written Exam should normally be completed prior to the 5th full semester (of the third year) of enrollment, with the Dissertation Proposal oral exam taking place toward the end of the same semester (and no later than the 6th semester). Candidates and their primary mentors should ensure that the committees for the requisite exams are in place and approved by the IASProgram Coordinator toward the end of the 4th semester, i.e. by the end of the second year. The procedures for Ph.D. students may be found on the Graduate Education website.

(i) Comprehensive Written Exam

The comprehensive written exam committee is made up of 3 committee members of the Graduate Faculty that have either taught the student in a lecture class, directed the student in an advanced lab class, or can ask questions that represent the student's previous courses. The committee members each write an exam section that will take approximately 2-3 hours to complete. The 3 sections will typically be administered separately by the Program Coordinator during the course of a single business day, usually with a short recovery period between each section. Any exceptions to this should be granted by the Program Coordinator. The student is responsible for determining the date of the exam in consultation with the 3 committee members and should make arrangements accordingly with the Program Coordinator.

The content of the questions is up to each individual committee member but it is expected that these questions will cover material the students have been exposed to in their coursework. comprehensive written exam committee members may ask a series of questions based on specific subject knowledge, or they may format an exam that requires the student to provide critical analysis of a research paper(s) or development and construction of a short research proposal. It is the student's responsibility to confer with each committee member to discuss expectations in the weeks prior to the exam, comprehensive written exam committee members may provide literature for the student to study before taking the exam. comprehensive written exam committee members should decide and communicate clearly to the student and to the Program Coordinator exactly what literature materials (hard copies or internet) the student may have access to during the formal examination time.

Each comprehensive written exam committee member will be responsible for grading the section that they wrote. The student must obtain a 70% (full pass) on 2 of the sections and at least a 50% (conditional pass) on the other section. The requirements for a conditional pass are to be determined by the appropriate comprehensive written exam committee faculty member and if they are not met, the assessment may be returned as not passing. If the student fails to obtain these percentages, they will have one additional chance to pass that section, in an exam that takes place no more than 1 month after the results of the initial exam are given to the student. The exact format of the retaken section should be prepared as described for the initial exam above. The student should be aware through discussion with the committee member that content may not necessarily be the same as in the first attempt.

(ii) Dissertation Proposal Oral Exam and Advancement to Candidacy

Following successful completion of the Written Comprehensive Exam, the student may prepare for the Dissertation Proposal Oral Exam. To formally set up the dissertation proposal committee and pre-candidacy Dissertation Proposal Oral Exam, a completed Doctoral Oral Examination Form must be submitted to the Doctoral Candidacy Advisor no less than 10 days prior to the proposed exam date. This form may be found on the Graduate Education website. The Doctoral Candidacy Advisor must

also prepare a Degree Audit Form for the student and primary mentor and this must be completed by the time of the Dissertation Proposal Exam.

The exam comprises two components to be executed within one semester of the Written Comprehensive Exam:

1) A written proposal of thesis research that conforms to the guidelines for submission of a grant proposal to the National Science Foundation. Guidelines for the proposal may be found on the NSF website (www.nsf.gov) and, in particular, candidates should refer to the following sections of the Proposal & Award Policies & Procedures Guide, NSF 17001 (the PDF file of which may be currently downloaded from https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp):

   - Chapter II.B (Format of the Proposal)
   - Chapter II.C.2.b (Project Summary)
   - Sections II.C.2.d.i and II.C.2.d.ii (Project Description)
   - Section II.C.2.e (References Cited)

   The Project Description should include a section on background material as well as the presentation and discussion of any relevant preliminary data so far accumulated. A budget is not required.

   The guidelines from an alternative science funding agency may be adopted, providing they are proposed by the candidate's primary mentor and approved by the IAS AC.

2) Upon completion of a satisfactory written thesis proposal (as determined by the candidate's primary mentor and secondary mentor), the student shall submit this proposal to their Dissertation Proposal Committee (dissertation proposal committee) members in advance of a closed oral presentation of the proposed thesis research of not more than 30 minutes. See Section C(3) for dissertation proposal committee details). dissertation proposal committee members should be given sufficient opportunity to read and critique the written proposal – no less than 1 week before the oral exam.

The Dissertation Proposal Oral Exam presentation shall include a question-and-answer session conducted by the candidate's dissertation proposal committee. If both the written proposal and oral examination satisfy the dissertation proposal committee (with a minimum of 3/5 faculty assigning a 'pass''), the exam result form is transmitted to the doctoral candidacy advisor in the Office of Graduate Education and the student is automatically advanced to candidacy.

If the outcome is unsatisfactory (with a minimum of 3/5 faculty assigning a 'fail'), the oral exam may be repeated once. The second attempt may not be scheduled within the same academic term as the first. An outside committee member (a Saint Louis University faculty member from another program) will be present at the second oral exam/proposal defense. Should the outcome of the second examination be unsatisfactory, the student will be dismissed from the program. Alternatively, a recommendation to transfer to a departmental, non-IAS terminal MS degree program may be made (see Section D(1)(e) below),

(e) Transfer to a Terminal MS Degree Program

There is no terminal MS degree in the IAS program itself. However, if the student fails to pass either the written or oral exam, s/he may be eligible to graduate from SLU with a terminal MS degree, or be

eligible to transfer into a departmental MS degree program – most likely awarded by the department of their primary mentor. Students in this situation must approach the graduate program coordinator for the relevant department and seek permission to transfer into that program. Any decision to accept or deny such a transfer is beyond the scope of the IAS program coordinator or administrative committee, and can only be completed at the discretion of the targeted department, their graduate student admissions committee, and ultimately with the approval of the Associate Dean for Graduate Affairs (via formal petition).

(f) Ph.D. Dissertation Research

After successful completion of the written and oral pre-candidacy examinations and the required coursework (as verified by the Degree Audit), the student will be automatically advanced to candidacy for the Ph.D. degree. With advancement to candidacy, the Ph.D. student officially undertakes his/her Ph.D. research. Typically, the IAS doctoral student will have already initiated his/her research prior to advancement to candidacy. Students may begin to accrue dissertation credits beginning in the semester during which they are expected to advance to candidacy – but not before. Students should enroll in IAS 6990 with the section number assigned to their primary mentor..

The dissertation proposal committee may be rolled into a 5-member dissertation defense committee, although it is permissible to reduce the number to 3 with the proviso that the primary mentor and secondary mentor remain on the committee.

After the research is completed, the candidate prepares his/her dissertation, which is then approved by his/her primary mentor, given to the each dissertation defense committee member (referred to as 'readers' in the Graduate Education Catalog) for corrections and approval.

(g) Dissertation Format

Students should prepare the dissertation according the most recent Formatting Guide, which may be found on the Graduate Education website. There is a Format Checklist found at the end of the Guide to be used as a final review. Format review by the Doctoral Candidacy Advisor is not done until after the Final Defense (see Section D(1)(i)) has taken place and all revisions completed.

(h) Public Presentation and Defense of Dissertation

At the beginning of the semester in which the student expects to defend their dissertation and complete all degree requirements, the student must submit an online Application for Degree. The instructions for completing this form, which is electronically submitted in Self-Service Banner, may be found on the Graduate Education website.

The Office of Graduate Education requires a public, oral presentation and defense of the dissertation. The presentation may be scheduled by the student in consultation with the dissertation defense committee after all committee members have approved the dissertation. The 'Notification of Readiness for the Public Oral Defense' form must be submitted to the Doctoral Candidacy Advisor at least 2 weeks in advance of the final defense date. IT IS HIGHLY RECOMMENDED THAT STUDENTS SUBMIT THIS FORM AT LEAST ***6 WEEKS*** IN ADVANCE OF THE FINAL DEFENSE.

Candidates anticipating May graduation must submit the aforementioned materials no later than the date set in the Office of Graduate Education's Calendar of Deadlines. Students should make arrangements with their home departmental administration for the date, time and location of their public presentation and are responsible for posting seminar announcement flyers in the departments of their primary mentor and secondary mentor. The oral presentation should itself last no longer than 30-40 minutes. Following the presentation, the candidate must be prepared to respond to questions from the assembled audience, followed by questions from the dissertation defense committee in a closed session. One of the committee members (not the primary mentor) serves as the moderator for the presentation and defense. The final defense normally will last 1-2 hours. The student will then be briefly excused, and the committee will complete the Results Form on whether to approve the dissertation and defense. A majority vote is required to pass. The dissertation defense committee may discuss the student's performance and will notify the student verbally of the results.

In the event of an unfavorable decision, the student will be notified immediately and a new defense date scheduled at an appropriate time. A new 'Notification of Readiness for the Public Oral Defense' form must be prepared and submitted to the Doctoral Candidacy Advisor. The procedure for a second defense is identical to the first. If the result is favorable, then the student may proceed to Format Review and Electronic Dissertation Submission. If the second exam yields an unfavorable result, no further attempts are permitted.

(i) Final Requirements and Electronic Dissertation Submission

Students who have passed the Final Dissertation Defense Oral Exam may proceed with a Format Review appointment with the Doctoral Candidacy Advisor. The Format Review appointment should be scheduled for a date after the Final Defense and after all required corrections requested by the dissertation defense committee members have been made to the dissertation. Instructions for making the Format Review appointment are typically received from the Doctoral Candidacy Advisor after the Application for Degree has been processed.

After the Format Review appointment and after any additional corrections are made for formatting, the student will need to convert the dissertation document into a singleProgram CoordinatorF file prior to submitting the document to Pro Quest/UMI. ProQuest digitally archives the dissertation and published the abstract via Dissertation Abstracts International. Complete instructions will be provided at the Format Review appointment. The Ph.D. degree will not be conferred until electronic submission has been successfully completed.

(j) Degree Schedule

Year	Date/Time	Curricular Activity	Curricular Activity Progress
1	Fall Spring Summer	Coursework Coursework + research Coursework + research	Student consults (and/or works) with primary mentor and secondary mentor is selected if not already known.
2	Fall Spring Summer	Coursework + research Coursework + research Coursework + research	Student takes Comprehensive Written Exam (focus on knowledge in required field(s)).
3	Fall, Spring & Summer	Dissertation research (IAS 6990) and Seminar/Current	Student takes pre-candidacy Dissertation Proposal Oral Exam (focus

		Topics courses(IAS 6010/6030 – Fall, Spring only)	on proposed dissertation research objectives) Student advances to Ph.D. Candidacy.
4 & 5	Fall, Spring & Summer	Dissertation research (IAS 6990) and Seminar/Current Topics courses (IAS 6010/6030 – Fall, Spring only)	Student writes, revises and defends dissertation.

(2) Entering MS Students

The guidelines discussed in Section D(1) are equally applicable to students who enroll in the in the IAS program with a SLU MS degree. Students will, under the guidance of their primary mentor and the IASProgram Coordinator, complete outstanding coursework for their chosen track and then proceed to the pre-candidacy examinations, ideally within the first semester or two of beginning the IAS program. Research MS students must have successfully defended their MS research thesis independent of any Ph.D. candidacy exams, although research from the MS degree may form the basis of Ph.D. dissertation research and be included in the final dissertation.

Students who have obtained appropriate MS degrees at other institutions may, according to Graduate Education policy and in consultation with the primary mentor and Program Coordinator, apply for advanced standing to receive credit for relevant coursework taken in their Master's, providing those courses transfer in with a minimum B grade. Such students must then accrue coursework credit as discussed in Section D(1). The petition for evaluation of advanced standing may be found on the Graduate Education website.

E. Assistantships and Fellowships - Detailed information regarding Assistantships and Fellowships may be found on the Graduate Education website.

Funding sources are distinguished by whether they are *Assistantships* or *Fellowships*. The former refer to stipends awarded in exchange for service to Saint Louis University, such as assisting professors in research or the teaching of undergraduate classes with large numbers of students. On the other hand, the latter category refers to awards that require no substantial commitment to the University. In other words, students funded by fellowships are expected to work full-time on their graduate classes and thesis research.

University policy allows a maximum number of five years of support (internal or external) for graduate students in a doctoral program. A sixth year of support is possible by written request of the Program Coordinator to the Associate Dean for Graduate Affairs in the College. The request must confirm that the student is making adequate progress toward his/her degree and acknowledge that the funding will be provided by either the program or student's mentor.

(1) Assistantships and Fellowships

(a) Teaching Assistantships

Students awarded a teaching assistantship (TA) 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 TA concurrently develops teaching skills and a deeper understanding of the discipline.

An 11-month award includes a stipend, tuition scholarship, and health insurance (plus an option to purchase family coverage). The contract period begins on July 1, at which time the student is **required** to be in residence. Upon petition to the IAS Program Director, under certain circumstances the start date may be delayed. The student is expected to begin preparing for laboratory/coursework duties during July and August.

(i) *Applicant Eligibility*

Normally, students applying for admission may be considered for TAs at the same time, if they so desire. The final decision on awarding a TA rests with the primary mentor's department and the Associate Dean for Graduate Affairs in the College of Arts & Sciences. The appointment to a TA will be by contract offered by the Graduate Program to the nominated individual.

Teaching assistants are normally eligible for renewal of their assistantship each year, up to the maximums described above, provided the student is in good standing. A student is not in good standing if any of the following apply:

- The student is not making expected progress through the degree program;
- the student's transcripts reflect more than one missing or incomplete ('I') grade;
- the student's cumulative *GPA is less than 3.0;*
- the student has received two consecutive unsatisfactory ratings on the annual review;
- normal time to degree has expired.

(ii) *Teaching Assistant Duties*

TAs will be assigned by the departmental graduate program coordinator of the department to instructional duties in the courses, lectures, and laboratories offered by the department. The appointment is considered half-time, and teaching duties may not require more than 20 hours per week (thus allowing the student to spend substantial time in laboratory research). The duties may include instructional time in the classroom or laboratory, necessary preparation for class or lab, marking papers, and other instructional activities as required. TAs 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 TAs 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 departmental Graduate Program Director to arrange their summer schedule as soon as they are notified that they have received an assistantship.

(iv) *Teaching Assistantship Evaluations*

Semester evaluations are to be completed by both faculty instructors overseeing the TA as well as by students being taught by the TA. All evaluations will be turned in to the department office to be

included in the graduate student's file.

Continuation is 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 TA is renewed. Based upon evaluations, the departmental graduate program coordinator may recommend that the student not receive a TA the following year. Alternatively, the graduate program coordinator may recommend a course of action that may improve performance of the student as a TA (e.g., enrollment in the Center for Teaching Excellence or acquisition of a faculty teaching advisor).

(b) Research Assistantships

Internal Research Assistantships (RAs) awarded by the IAS program are intended as 'bridge' funding for students in time periods where external support (see Section E(2)) for students is not available. Unless approved by the IAS Program Coordinator and the Associate Dean for Graduate Affairs, they may not be renewed after one year. An RA 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 that complement the student's graduate education.

An 11-month award includes a stipend, tuition scholarship, and health insurance (plus an option to purchase family coverage). The contract period begins on July 1, at which time the student is **required** to be in residence. Summer registration is mandatory. Deadline for application: March 1.

(i) *Applicant Qualification*

Any applicant for graduate degree study in the IAS program may apply for an RA by letter to the IAS Program Coordinator stating their need for the assistantship. There are normally no instructional duties associated with appointment to a RA. Instead, the RA is assigned to a faculty sponsor (primary mentor) responsible for directing research duties of the student.

(ii) *Criteria for Assignment of Research Assistantships*

The IAS administrative committee uses the following criteria in nominating individuals for RAs:

- Academic standing. Includes undergraduate grade point average (GPA), graduate school GPA, and Graduate Record Examination (GRE)[†] General Test scores;
- Letters of reference and any additional materials (publications, presentations, etc.);
- Satisfactory rating on the Annual Report evaluation;
- Identification by the student of a faculty member in whose lab the student will carry out research. This must include a letter from the faculty member. This is a mandatory requirement for admission to the IAS program.
- Term of the student's graduate program. Students nearing the end of their graduate program who could greatly benefit from an RA may be given a modest priority.

Research assistants are normally eligible for renewal of their assistantship each year, up to the maximums described above, provided the student is in good standing. A student is not in good

[†] Not required for admission to the IAS program but if scores are available they may be taken into consideration.

standing if any of the following apply:

- The student is not making expected progress through the degree program;
- the student's transcripts reflect more than one missing or incomplete ('I') grade;
- the student's cumulative *GPA is less than 3.0;*
- the student has received two consecutive unsatisfactory ratings on the annual review;
- normal time to degree has expired.

(c) Fellowships sponsored by the Office of Graduate Education

- ***Dissertation Fellowship***

  During the writing phase of the dissertation, the Ph.D. student may be eligible for a Dissertation Fellowship for his/her final year in the program. The student must be nominated by the IAS administrative committee. In general, students are not obliged to carry out any instructional or research duties, other than those associated with their thesis or dissertation research. Information and application packet may be found on the Graduate Education website

- ***Diversity Fellowship***

  This fellowship includes an 11-month stipend, health insurance, and a tuition scholarship of 18 hours during the regular academic year and 3 hours during the summer session (summer registration is mandatory). The student must be nominated by the IAS administrative committee and the application is coupled to the admissions process. The award is for a maximum of four years for a Doctoral degree recipient. Information and application packet may be found on the Graduate Education website.

- ***Presidential Fellowship***

  This fellowship includes an 11-month stipend, health insurance, and a tuition scholarship of 18 hours during the regular academic year and 3 hours during the summer session (summer registration is mandatory). The award is targeted for students who have demonstrated outstanding scholastic achievement in their degree programs prior to application for the Ph.D.. The student must be nominated by the IAS administrative committee and the application is coupled to the admissions process. The award is for a maximum of four years for a Doctoral degree recipient. Information and application packet may be found on the Graduate Education website.

(d) Other Fellowships/Scholarships

Students may receive financial support from outside sources. The terms of such awards will be specified by the award sponsor. In general, students with fellowship support will pursue their degree requirements, but will not be obliged to carry out any instructional or research duties, other than those associated with their thesis or dissertation research. The terms of appointment, continuation, and maximum support will be governed by the terms for teaching assistantships, unless there are overriding conditions specified by the fellowship sponsor.

(2) External Funding

This is the primary mode of student financial support in the IAS Program. Individual departments or programs may receive funding from sources external to the University for support of graduate students. From such grants, graduate students may be appointed to research assistantships, fellowships or traineeships consisting of stipends and tuition scholarships with the academic approval of the Associate Dean for Graduate Affairs in the College of Arts & Sciences. Trainees will be required to participate in training experience as demanded by the grantor. Such awards are made for one year, but ordinarily are renewable. If expired external grants leave students unfunded, then application for a Graduate Program RA may be made by the primary mentor through the IAS administrative committee.

Note that even though grant funds come from an external source, the awards still count toward the maximum years of support the student may receive, as defined by the University.

(a) Governmental Support from Research Grants

Faculty members will sometimes agree to pay a graduate student's stipend from grant funds. In such cases, the faculty member can petition the College for a tuition scholarship for that student. Tuition scholarships may or may not be provided, depending upon funds available for this purpose.

(b) Private Grants

Funding from foundations, corporations and private individuals may also be used to cover all or part of the tuition and cost-of-living. The number of such private funding sources is truly very large. Students are encouraged to consult with the Office of Research Services for assistance in identifying potential funding opportunities.

Additionally the COS (Community of Science) Pivot Funding Opportunities website (http://pivot.cos.com/) is a large, comprehensive online database providing access to information for graduate school scholarships and other sources of funding for graduate school external to Saint Louis University. The COS Funding Opportunities website also allows individuals to search by search term, allowing individuals to pursue funding for research interests or tuition assistance.

(3) Graduate Student Orientation

All new graduate students awarded assistantships or fellowships are required to attend the New Graduate Assistant/Fellow Orientation at the beginning of their first semester. Announcements of the time and place are sent to each new assistant prior their first semester in residence. Orientations organized by the Office of Graduate Education are typically held at the beginning of the Fall and Spring semesters. Information may be found on the Graduate Education website. Students may be required to attend departmental orientations depending on their primary mentor's home department and the type of assistantship. Failure to attend required orientation(s) is considered a violation of any Assistantship contract and may result in the loss of eligibility for funding.

F. Student Appeals Procedures

A student who has failed either pre-candidacy exam may appeal the decision that has led to them being terminated them from the program.

(1) Comprehensive Written Exam

An initial appeal must be made within 30 days of the decision communicated or made available to the student. A statement of appeal should first be submitted to the comprehensive written exam committee faculty member(s) concerned and copied to the IAS program coordinator. If any comprehensive written exam committee member denies the appeal, the student has 30 days from this decision to submit an appeal to the IAS administrative committee via the program coordinator. If the decision of the comprehensive written exam committee member is upheld by the administrative committee, the student has 30 days from when this decision was communicated to submit their appeal to the Board of Graduate Education (BGE) of the College of Arts & Sciences (see Section F(4) below).

(2) Dissertation Proposal Oral Exam

An initial appeal must be made within 30 days of the decision communicated or made available to the student. A statement of appeal should first be submitted to the primary mentor, who will forward it for consideration by the secondary mentor and dissertation proposal committee/dissertation defense committee. The appeal should be concomitantly forwarded to the IAS program coordinator. The dissertation proposal committee/dissertation defense committee will confer and if the appeal is denied, the student has 30 days from when this decision was communicated to submit their appeal to the IAS administrative committee via the program coordinator. If the decision of the dissertation proposal committee/dissertation defense committee is upheld by the administrative committee, the student has 30 days from when this decision was communicated to submit their appeal to the Board of Graduate Education (BGE) of the College of Arts & Sciences (see Section F(4) below).

(3) Appealing Decisions Made by Student Mentors

Students in disagreement with any decision made by their mentors that directly affects their status in the IAS Ph.D. program (such as withdrawal of funding) may appeal that decision. A formal written appeal must first be made to the primary mentor. If the primary mentor denies the appeal, the student may submit a formal appeal to the IAS administrative committee via the program coordinator within 30 days of receiving such notification from the primary mentor. If the decision is upheld by the administrative committee, the student has 30 days from when this decision was communicated to submit their appeal to the Board of Graduate Education (BGE) of the College of Arts & Sciences (see Section F(4) below).

(4) Appeals to the Board of Graduate Education

Due to the disciplinary nature of written and oral qualifying examinations, the University holds that decisions regarding passage or failure are properly the purview of programs or departments. Such decisions are unlikely to be overturned by the Board of Graduate Education.

Nevertheless, should the student wish to pursue the appeal process beyond the program, 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 Affairs 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 an 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 Sciences but not from any department 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 Affairs 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 (1) support the decision being appealed, (2) overturn it, or (3) 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 Provost for Graduate Education. This must occur within 30 days of the decision by the BGE. The Associate Provost 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 Associate Provost cannot overturn a decision but may remand the decision back to CAS for further investigation if the process was not followed.

G. Departmental Concentrations

Concentration: Chemistry

Departmental Courses (9-12 credits)

Core

- CHEM 5150 Statistical Methods for Physical Scientists (3)
- CHEM 5160 Advanced Synthetic Chemistry (3)
- CHEM 5170 Advances in Analysis and Modeling of Chemical Systems (3)
- CHEM 5200 Analytical Chemistry II (3)
- CHEM 5205 Analytical Chemistry III Lab (1)
- CHEM 5230 Mass Spectrometry (3)
- CHEM 5250 Bioanalytical Methods of Analysis (3)
- CHEM 5260 Analytical Separations (3)
- CHEM 5270 Electroanalytical Chemistry (3)
- CHEM 5280 Chemical Sensors (3)
- CHEM 5290 Special Topics in Analytical Chemistry (3)
- CHEM 5300 Mathematical Techniques in Chemistry (3)
- CHEM 5330 Advanced Physical Chemistry (3)
- CHEM 5340 Advanced Thermodynamics (3)
- CHEM 5350 Elements of Surface and Colloid Science (3)
- CHEM 5370 Computational Chemistry (3)
- CHEM 5390 Special Topics in Physical 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 Principles of 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 5570 Group Theory & Spectroscopy (3)
- CHEM 5590 Special Topics in Inorganic Chemistry (3)
- CHEM 5610 Biochemistry (3)
- CHEM 5615 Biochemistry 2 (3)
- CHEM 5620 Biophysical Chemistry (3)
- CHEM 5630 Introduction to Chemical Biology and Biotechnology (3)
- CHEM 5700 Environmental Chemistry (3)
- CHEM 5800 Fundamentals and Design of Nanomaterials (3)
- CHEM 5850 Polymer Chemistry (3)
- CHEM 5x99 Introduction to Research: Analytical, Physical or Organic (3)

Seminar

- CHEM 5920 Seminar (0) - Students should register for zero credit hours each semester of their first 2 years before registering for IAS 6010 in years 3 and 4 – see below.

Interdisciplinary Courses (18-21 credits)

Interdisciplinary (out of department) – Students will choose 2-3 courses from Earth & Atmospheric Sciences, Engineering, Physics, Mathematics, Biology, Biomedical Engineering, or Biomedical Sciences (6)

Interdisciplinary Seminar (interdepartmental)

- IAS 6010 Interdisciplinary Seminar (4) – Students will register for 1 hour per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research Discussion Group (interdepartmental)

- IAS 6030 Current Topics in Interdisciplinary Research (8) - Students will register for 2 hours per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research – Students may carry out research in the disciplines outlined above as it relates to their own research project in this track (1-3)

Research Credits (12 credits)

- IAS 6990 Dissertation Research – Students must register for the section number assigned to their primary mentor.

Concentration: Biology

Departmental Courses (9 - 12 credits)

Core

- BIOL 4060 Structure and Function of Ecosystems (3)
- BIOL 4090 Plant Ecology (3)
- BIOL 4260 Biology of Amphibians and Reptiles (4)
- BIOL 4270 Field Studies with Amphibians and Reptiles (1)
- BIOL 4280 Biology of Fishes (4)
- BIOL 4310 Biology of Birds (4)
- BIOL 4320 Cave Biology (4)
- BIOL 4330 Spring Flora of the Ozarks (4)
- BIOL 4340 Systematic Biology (3)
- BIOL 4350 Biology of Parasitic Organisms (4)
- BIOL 4360 Animal Behavior (3)
- BIOL 4370 Animal Behavior Laboratory (1)
- BIOL 4380 Biology of Mammals (4)
- BIOL 4400 Applied Ecology (3)
- BIOL 4450 Ecological Risk Assess/Risk Management (3)
- BIOL 4480 Conservation Biology (3)
- BIOL 4600 Developmental Biology (3)
- BIOL 4630 Foundations of Immunobiology (3)
- BIOL 4640 General Microbiology (3)
- BIOL 4650 Microbiology Lab (2)
- BIOL 4670 Population Biology (3)
- BIOL 4680 Landscape Ecology and Management (3)
- BIOL 4700 Molecular Biology (3)
- BIOL 4760 Plant Biochemistry (4)
- BIOL 4910 Internship in Conservation (3)
- BIOL 5060 Advanced Topics in Molecular Biology (4)
- BIOL 5070 Advanced Biological Chemistry
- BIOL 5100 Cellular and Molecular Genetics (3)
- BIOL 5120 Signal Transduction (3)
- BIOL 5190 GIS in Biology (3)
- BIOL 5300 Problems in Vertebrate Physiology (2-4)
- BIOL 5340 Problems in Cell Biology (1-2)
- BIOL 5350 Current Topics in Cell Biology
- BIOL 5400 Problems in Genetics (1-4)
- BIOL 5410 Ecological Genetics (3)
- BIOL 5420 Problems in Evolutionary Biology (1-4)
- BIOL 5450 Biogeography (3)
- BIOL 5460 Systematic Biology (3)
- BIOL 5480 Conservation Biology (3)
- BIOL 5500 Problems in Ecology (2-4)
- BIOL 5550 Advanced Ecology (3)

- BIOL 5600 Development Genetics (3)
- BIOL 5670 Advanced Population Biology (3)
- BIOL 5700 Advanced Molecular Biology (3)
- BIOL 5770 Coevolution (3)
- BIOL 5840 Graduate Seminar in Ecol, Evol, and System (2)
- BIOL 6040 Current Topics in Developmental Biology (3)
- BIOL 6150 Neural Basis of Behavior (3)
- BIOL 6510 Plant-Water Relationships (3)
- BIOL 6970 Research Topics (1-3)
- BIOL 6980 Graduate Reading Course (1-3)

Seminar

- BIOL 5810 Department Seminar (0)
- BIOL 5820 Graduate Seminar/Cell and Molec Regulation (2)
- BIOL 5860 Scientific Communication Practicum (3)

Interdisciplinary Courses (18-21 credits)

Interdisciplinary (out of department) – Students will choose 2-3 courses from Earth & Atmospheric Sciences, Engineering, Physics, Mathematics, Chemistry, Biomedical Engineering, Biomedical Sciences, or GIS courses.

Interdisciplinary Seminar (interdepartmental)

- IAS 6010 Interdisciplinary Seminar (4) – Students will register for 1 hour per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research Discussion Group (interdepartmental)

- IAS 6030 Current Topics in Interdisciplinary Research (8) - Students will register for 2 hours per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research – Students may carry out research in the disciplines outlined above as it relates to their own research project in this track (1-3)

Research Credits (12 credits)

- IAS 6990 Dissertation Research – Students must register for the section number assigned to their primary mentor.

Concentration: Environmental Sciences and GIS

Departmental Courses (9-12 credits)

Core

- EAS 4350 Ground Water Hydrology (3)
- EAS 4500 Scientific Communication (2)
- EAS 5190 Seminar in Geoscience (3)
- EAS 5900 Geoscience Journal Club (1)
- EAS 5170 Divergent/Convergent Margins (3)
- EAS 5180 Transform/Plate Interiors (3)
- EAS 5600 Atmospheric Chemistry (3)
- GIS 5010 Introduction to GIS (3)
- GIS 5020 Intermediate GIS (3)
- GIS 5040 Introduction to Remote Sensing (3)
- GIS 5060 Geospatial Methods in Environmental Studies (3)
- GIS 5070 Research Methods (3)
- GIS 5080 Digital Cartography & Geovisualization (3)
- GIS 5090 Introduction to Programming for GIS and Remote Sensing (3)
- GIS 5091 Advanced Programming for GIS and Remote Sensing (3)
- GIS 5092 Machine Learning for GIS and Remote Sensing (3)
- GIS 5100 Microwave Remote Sensing: SAR Principles, Data Processing & Applications (2-3)
- GIS 5110 Interferometric Synthetic Aperture Radar (3)
- GIS 5120 Geographic Information Science, Society and Sustainability (3)
- GIS 5970 Research Topics (0-6)

Interdisciplinary Courses (18 – 21 credits)

Interdisciplinary (out of department) - *2-3 courses from pre-approved lists from affiliated departments should be taken in the research emphasis area, outside the research specialization of the Ph.D. candidate. A sample of these courses includes:*

- BIOL 4680 Landscape Ecology and Management (3)
- BIOL 5190 GIS in Biology (3)
- BIOL 5480 Conservation Biology (3)
- BIOL 5500 Problems in Ecology (3)
- CHEM 5700 Environmental Chemistry (3)
- SOC 5205 Science, Technology, & Public Policy (3)
- BSDP 5101 Fundamentals of Disaster Planning (3)
- EOH 5970 Research Topics in Environmental & Occupational Health (3)
- EAS 5340 Cloud Physics (3)

Interdisciplinary Seminar (interdepartmental)

- IAS 6010 Interdisciplinary Seminar (4) – Students will register for 1 hour per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research Discussion Group (interdepartmental)

- IAS 6030 Current Topics in Interdisciplinary Research (8) - Students will register for 2 hours per Fall/Spring semester in years 3 and 4.

- **Interdisciplinary Research –** Students may carry out research in the disciplines outlined above as it relates to their own research project in this track (1-3)

Research Credits (12 credits)

- IAS 6990 Dissertation Research – Students must register for the section number assigned to their primary mentor.

Concentration: Physics - Nanomaterials and Condensed Matter

Departmental Courses (9-12 credits)

Core

- PHYS 5010 Nanoscience and Nanofabrication Frontiers
- PHYS 5020 Experimental Physics
- PHYS 5030 Mathematical Methods in Classical Mechanics
- L31 Physics 505 Classical Electrodynamics I (WashU) 3
- L31 Physics 523 Quantum Mechanics I (WashU) 3

Interdisciplinary Courses (18-21 credits)\

Interdisciplinary (out of department) – *Courses selected outside the core department (Choose 2-3 courses from this list, but no more than two 400-level courses)*

- CHEM 5570 Group Theory & Spectroscopy
- CHEM 5340 Advanced Thermodynamics
- CHEM 5370 Computational Chemistry
- CHEM 5800 Fundamentals and Design of Nanoarchitectures
- CHEM 5560 Solid State Chemistry
- ECE 5131 Low Noise Electronics Design
- ECE 5132 Analog Integrated Circuit Design
- ECE 5235 Digital IC Design
- ECE 5142 Microwave Theory & Techniques
- ECE 5143 Antenna Theory and Design
- ECE 5150 Advanced Filter Design

Interdisciplinary Seminar (interdepartmental)

- IAS 6010 Interdisciplinary Seminar (4) – Students will register for 1 hour per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research Discussion Group (interdepartmental)

- IAS 6030 Current Topics in Interdisciplinary Research (8) - Students will register for 2 hours per Fall/Spring semester in years 3 and 4.

Interdisciplinary Research – Students may carry out research in the disciplines outlined above as it relates to their own research project in this track (0-3)

Research Credits (12 credits)

- IAS 6990 Dissertation Research – Students must register for the section number assigned to their primary mentor.

201x Student Annual Report

SAMPLE*

"[Click here & type Name & Surname]"

Research report for the degree of

Doctor of Philosophy (Ph.D.) in Integrated & Applied Sciences

"[Click here & type Concentration]"

"[Click here & type Date]"

* Request fillable electronic copy from the IAS Program Coordinator (vasit.sagan@slu.edu)

1. COURSES TAKEN – TO BE COMPLETED BY STUDENT

1. Spring 201n

<type text - box will expand automatically>

2. Summer 201n

3. Fall 201n

4. If the written comprehensive exam was taken, provide the following information:

Date of exam: Exam committee faculty member #1 / dept: Exam committee faculty member #2 / dept: Exam committee faculty member #3 / dept:

2. RESEARCH PRODUCTIVITY – TO BE COMPLETED BY STUDENT

1. Research (provide a brief summary of research project(s), no more than 500 words).

2. Provide dissertation proposal exam information (if known).

Dissertation committee chairman (primary mentor) / dept:
Dissertation committee member #2 (secondary mentor) / dept:
Dissertation committee member #3 / dept:
Dissertation committee member #4 / dept:
Dissertation committee member #5 / dept:
Date of oral exam (if taken):

3. Publications (provide: authors, title, publication name, year, volume/chapter, page numbers).

    a. Peer-reviewed journal articles.

    b. Conference proceedings.

    c. Non peer-reviewed articles and papers.

    d. Research abstracts.

e. Monographs, books, and book chapters.

f. Textbooks.

g. Edited publications.

h. Reviews of books and scholarship.

4. Lectures, papers, speeches presented at professional meetings/settings or educational institutions (provide: authors, presentation title, meeting name, location, month, year).

5. Local, regional, national or international recognition or awards.

6. Publications in progress.

7. Specific research goals for coming year.

8. Projected month/year for final Ph.D. defense.

Forward to your research mentor for completion.

3. RESEARCH PRODUCTIVITY – TO BE COMPLETED BY PRIMARY FACULTY MENTOR

1. Name and department.

<type text - box will expand automatically>

2. Name and department of secondary mentor (if assigned).

3. Please indicate funded grants/contracts used to support research by this student.

4. Please indicate unfunded grants/contracts intended to support research by this student. Indicate whether pending or unsuccessful.

5. Provide brief assessment of student's research progress.

6. Rate student's academic standing (according to the IAS Program Handbook): satisfactory or unsatisfactory.

Email completed report to: vasit.sagan@slu.edu.

4. PROGRAM DIRECTOR NOTES

1. Date for meeting student & Primary Mentor.

<type text - box will expand automatically>

2. Program Coordinator Notes.

3. Final assessment: satisfactory or unsatisfactory.
