GRADUATE PROGRAMS IN SYSTEMS SCIENCE

Systems Science Graduate Program
Portland State University

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Contents

Introduction

Systems Science is the study of general principles governing systems of widely differing types, and the use of systems ideas and methods in interdisciplinary research and socio-technical system design and management. Systems science draws on the natural and social sciences, mathematics, computer science, and engineering to address complex problems in the public and private sectors. Systems concepts and techniques are extensively used for both applied and research purposes.

Doctoral Degree

The Ph.D. Program encompasses both applications and theory-oriented aspects of the field. It is designed to prepare students for research and teaching in academic institutions and for professional practice in industrial, governmental, and public service. There are two options for doctoral degrees: A core, where the student pursues interdisciplinary studies with a strong emphasis on systems methods and theories, and a multidisciplinary option where the student relates core systems ideas to two distinct academic fields.Subject areas include environmental systems, sustainability, energy, health policy, biomedical data analysis, and other topics where systems ideas or methods make unique contributions to knowledge. Topics include systems thinking, system structure and dynamics, data modeling, computer simulation, networks, complex adaptive systems, decision analysis, and optimization.

Master's Degree

Students choose a combination of systems science courses plus approved courses in associated disciplines. Topics and subject areas are the same as those for the PhD program. Students learn a wide variety of systems ideas, use them for modeling and analysis in conjunction with ideas and methods from other disciplines, and gain expertise in problem solving and integrative thinking.

Students may choose between three options to fulfill requirements of the degree: the thesis option, examination option, or the coursework-only option.

Graduate Certificates

Graduate certificates are available in two specialty areas: Computer Modeling and Simulation, and Computational Intelligence:

> The certificate in Computer Modeling and Simulation encompasses continuous, discrete, and agent-based simulation, with electives that include discrete multivariate modeling, modeling & simulations with R & Python, and statistical modeling of structure. Typical application areas include process engineering, policy evaluation, data analysis & interpretation, and the study of feedback dynamics in complex systems.

> The certificate in Computational Intelligence encompasses neural networks, evolutionary computing, artificial intelligence, data mining and machine learning. Typical application areas include pattern recognition, control, signal processing, and non-linear optimization.

Admissions

Applications for admission to the doctoral or master's program are due on January 15 of each year, and admitted students begin coursework the following fall quarter. Applications for graduate certificates are due quarterly, on April 1, September 1, or November 1 for fall, winter, and spring terms, respectively.

The application process for all programs or certificates, is done via CollegeNet, which includes several items, as outlined below.

> A TOEFL is required for foreign applicants. General information on graduate admissions is available in the PSU bulletin see:
> (http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Admissions-Requirements)

Doctoral Program Admissions

To apply to the doctoral program, Systems Science must receive via CollegeNet:

1. The completed Application to Graduate Program
2. Academic transcripts from all institutions attended
3. GRE scores
4. three letters of recommendation
5. The student's personal statement
6. TOEFL scores (575 or higher) or other evidence of English competency if a foreign student
7. Any other evidence of intellectual capacity or professional background that the student wishes to include.

The admission committee focuses on the following in determining the applicant's qualifications for the Ph.D. Program:

Academic Transcripts demonstrating:

1. Undergraduate GPA of 3.25 or higher, and graduate GPA, if applicable, of 3.5 or higher
2. Undergraduate and/or graduate training in one or more appropriate disciplines
3. Adequate preparation and the potential to pursue advanced study and research for the PhD

The following are recommended technical background for the program but are not prerequisites for admission:
> Calculus (up to and including simple ODEs)
> Introductory programming/scripting,
> Linear Algebra
> Statistics

GRE Test Scores:
1. In the upper quartile, taken within the last 5 years

2. The 5-year requirement is waived if both GRE scores are in the 90th percentile

Letters of Recommendation:
Three letters of recommendation from faculty and/or professionals acquainted with the applicant's abilities, background, and potential for doctoral research

Personal Statement:
A personal statement explaining how the program fits with the student's interests and goals, and why the student is a good fit for the program (environmental relevance is helpful)

Other evidence of intellectual capacity or professional background in relevant areas submitted by applicant

Master's Program Admissions

Students admitted to the doctoral program need not apply separately for admission to the master's program. But to add the master's to their doctoral program they must submit the GO-19D form (see http://www.pdx.edu/ogs/forms) to the Office of Graduate Studies at least one term before they apply for completion of the master's degree.

For those not admitted to the doctoral program, Systems Science must receive via CollegeNet

1. The completed Application to Graduate Program
2. Academic transcripts from all institutions attended,
3. Two letters of recommendation,
4. The student's personal statement,
5. TOEFL score of 575 or higher or other evidence of English competency if a foreign student, and
6. Any other evidence of intellectual capacity or professional background that the student wishes to include.

The admission committee will consider the following in determining the applicant's qualifications:

Academic Transcripts:
Academic Transcripts demonstrating an undergraduate GPA of 3.00 or higher

GRE (*recommended*):
GRE scores, if provided
Letters of Recommendation:
Two letters of recommendation

Personal Statement:
A personal statement (This should explain how the program fits with the student's interests and goals, and why the student is a good fit for the program. An environmental focus is helpful but not essential.)

Other evidence of intellectual capacity or professional background in relevant areas submitted by applicant

Graduate Certificate Admissions

Students admitted to the master's or doctoral program need not apply separately for admission to a graduate certificate. But to add the certificate to their master's or doctoral program they must submit the GO-19M or GO-19D form (see http://www.pdx.edu/ogs/forms) to the Office of Graduate Studies at least one term before they apply for completion of the certificate.

For those not admitted to the doctoral or master's program, Systems Science must receive via CollegeNet:

1. The completed Application to Graduate Certificate
2. Academic transcripts from all institutions attended.

Although an overall undergraduate GPA of 3.0 is typical, a lower GPA could be considered depending on the specifics of the course grades.

Advising

Each doctoral and M.S. student is assigned an advisor at admission to assist them in planning their program of study and research. For doctoral students, the adviser is responsible for assisting the student in his/her program up to the appointment of a comprehensive examination committee. At that time, the chair of the comprehensive examination committee becomes the student's adviser, and serves in that capacity until the doctoral student's dissertation committee is appointed, at which time the chair of the dissertation committee becomes the student's adviser.

For master's students who choose the thesis option or the examination option, the initial adviser will assist the student in planning his or her program up to the appointment of a master's thesis committee or comprehensive examination committee, at which point the committee chair will assume advising responsibilities. For master's students who choose the coursework only option, the initial adviser is responsible for assisting the student in his/her program throughout the entire degree.

Students pursuing a graduate certificate will be advised by the faculty member who oversees that certificate. Currently the computer modeling and simulation certificate is overseen by Prof. Wayne Wakeland, and the computational intelligence certificate is overseen by Prof. Martin Zwick.

Student Responsibility

All students pursuing a degree or graduate certificate are responsible for knowing the regulations and procedures in the PSU bulletin (see http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies) and in this handbook. In unusual cases with extenuating circumstances, students may seek accommodations from the program, and may also petition the Graduate Council for the waiver of a University graduate academic regulation or degree requirement. However, the University reserves the right to require the withdrawal of any student who fails to accept responsibilities, as evidenced by conduct or scholastic achievement.

Degree Requirements

Doctoral Degree

General requirements for doctoral degrees can be found at:

http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies/Degree-requirements

Additionally, Systems Science requires that students complete 84 graduate credit hours, which can include up to 28 hours of graduate credits completed at other institutions. 48 credits must be completed prior to comprehensive exams; 9 additional credits are required prior to advancement to candidacy, and 27 dissertation credits are required prior to graduation. Students must take SySc 511 (Systems Theory) and SySc 513 (Problem Solving) as letter-graded courses, and must take 3 credits of SySc 507 (Seminar). The remaining 46 hours are completed via one of two options:

1. Core option. Students must complete an additional 24 credits of letter-graded Systems Science *labeled courses. The remaining 22 credits might be systems science labeled courses, by-arrangement credits, or courses from an outside discipline. The student's three comprehensive exams will cover 48 credit hours, including two SySc exam areas of at least 16 credits each, and one field exam area of at least 15 credits.*

2. Multidisciplinary option. Students must complete an additional 16 credits of letter-graded Systems Science labeled courses plus 15 or more credits from each of two outside and distinct disciplines. *The student's three comprehensive exams will cover 48 credit hours, including one SySc exam area of at least 16 credits, and two choice exam areas with at least 15 credits each, one for each selected and distinct discipline.*

All doctoral students must pass all letter-graded courses with at least a B grade, and their cumulative GPA must be at least 3.25. Once a student has completed all of the coursework required for his or her comprehensive examinations, he or she forms a comprehensive examination committee with three members, including a core faculty member from Systems Science.

Comprehensive Examinations. Within two to three years after admission (five years maximum), doctoral students must pass their comprehensive exams consisting of three written exams and an oral exam by his or her comprehensive exam committee.

Advancement to Candidacy. After passing comprehensive exams, the student prepares a prospectus for dissertation research and recruits dissertation committee members under his or her adviser's supervision. An application is sent to the Office of Graduate Studies, who will officially appoint the committee. Once appointed, the chair of the committee becomes the student's adviser. The student then prepares a proposal for independent research that will result in a significant and original contribution to knowledge in the systems field. When the proposal is defended and approved by the committee and the 57 credit hour requirement (including transfer credits) and all other conditions have been met (including IRB approval if human subjects are involved), the student is advanced to candidacy. PSU requires students to be advanced to candidacy within 3 years of completing their comprehensive examinations.

Dissertation. Once the doctoral student has been advanced to candidacy, he or she completes the proposed dissertation work. Prior to their dissertation defense, doctoral students present their research at the Systems Science Seminar.

The candidate's final defense of his or her completed dissertation is a presentation open to the public. It must be completed by the end of the 6th week of a term, and no later than 5 years after the student's advancement and no later than 12 years after the student's admission. Typically, the dissertation is completed in one or two years after the proposal is approved. The formal defense is often preceded by a pre-defense meeting two weeks earlier, where the committee may recommend the candidate do more work before attempting the final formal defense.

Prior to graduation, students must register for 27 credits of dissertation research (SySc 603), 9 of which may be taken upon completion of comps; another 9 may be taken after the dissertation committee has been requested (with form GO-16D); the rest must be taken after the dissertation proposal has been approved. The student can anticipate approximately four to six years of full-time study beyond the baccalaureate degree in order to satisfy the program requirements.

Master's Degree

General requirements for master's degrees can be found at:

http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies/Degree-requirements/Master-s-Degree

 Among the 45 hours required, 24 credits must come from letter-graded courses (pass/no pass are not applicable) listed under Systems Science in the PSU Bulletin numbered SySc 510-599 or SySc 610-699. The remaining 21 credits can be satisfied through one of three options:

1. Thesis Option: An additional 12 credits that can be letter-graded Systems Science courses (numbered as above), approved courses from other departments (see http://www.pdx.edu/sysc/approved-courses-ms-sysc), up to 3 credits of SySc 507 (Seminar) with a pass grade, and/or up to 4 Systems Science by-arrangement credits. The student must also complete 9 thesis credits and write a master's thesis. A student selecting the thesis option must form a thesis committee of at least three faculty members, including a core faculty member from Systems Science.

2. Examination Option: An additional 21 credits that can be Systems Science courses (numbered as above), up to 3 credits of SySc 507 (Seminar) with a pass grade, approved courses from other departments (see http://www.pdx.edu/sysc/approved-courses-ms-sysc), and/or up to 4 Systems Science by-arrangement credits. A student selecting the examination option will be required to pass two written comprehensive exams, each of which covers a minimum of 16 credit hours of coursework.

3. Coursework-Only Option: An additional 8 letter-graded Systems Science courses (numbered as above), plus 13 credits of courses that may be either Systems Science courses (numbered as above), approved courses from other

departments (see http://www.pdx.edu/sysc/approved-courses-ms-sysc), up to 3 credits of SySc 507 (Seminar) with a pass grade, and/or up to 4 credits of Systems Science by-arrangement credits.

Graduate Certificates

General requirements for graduate certificates can be found at:

http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies/Degree-requirements/Graduate-certificates

Systems Science requires that students complete 16 credit hours of courses within the specialty area of their chosen certificate, including one required course. For the Computer Modeling and Simulation certificate, SySc 514 (System Dynamics) is the required course, and for the Computational Intelligence certificate, SySc 575 (Neural Networks I) is the required course. Students select three additional courses from those listed on the graduate certificate program page (http://www.pdx.edu/sysc/program-systems-science-graduate-certificates). One special topics course (SySc 510/610) for up 4 credit hours may be approved for inclusion by the program chair.

Graduate certificate students must earn at least a B in all courses and their cumulative GPA must be at least 3.25. More detailed information is available in the Systems Science Graduate Student Handbook at http://www.pdx.edu/sysc.

Currently the Computer Modeling and Simulation certificate is overseen by Prof. Wayne Wakeland, and the Computational Intelligence certificate is overseen by Prof. Martin Zwick.

Students do not need to be formally admitted to begin taking courses towards a graduate certificate. However, all courses applied to the certificate must be no more than seven years old at the time the certificate is awarded, students must be currently enrolled in order to graduate, and they must have applied for the certificate at least one term before they graduate. So students pursuing only a graduate certificate should apply for the certificate at least a full term before they expect to complete requirements, and they should apply for graduation during their final term of coursework. Applications to complete a graduate certificate must be submitted by the first Friday of the anticipated term of graduation. Students should also notify the Systems Science office when they are finishing their last course, so that the program staff can prepare the program completion form.

Students who are simultaneously pursuing a master's or doctoral degree can wait to apply for the graduate certificate program and for graduate certificate graduation until after they have completed all requirements. But courses must have been completed within the last seven years, the student is required to be currently enrolled in order to apply for graduation, they must apply for the certificate at least one term before they graduate, and they must graduate from the graduate certificate before or concurrently with their graduation from the degree program.

Enrollment Requirements

The Office of Graduate Studies has several requirements for graduate level enrollment (see http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies/Enrollment), many of which are applicable to all graduate students pursuing a doctorate, master's, or graduate certificate. These include the graduate level grading system, students' responsibility to drop unwanted courses, the process of acquiring and removing 'incomplete' grades, and requirements for good academic standing. Several additional requirements are noted below.

Validation of admission

All graduate students must register for a minimum of one credit during their term of admission, or else they must notify the program chair and contact the Admissions Office to request that the admission be updated to another term within a one-year period. Failure to enroll will result in cancellation of admission.

Continuous enrollment

Doctoral and master's students are required to be enrolled continuously for at least one credit per term (excluding summer) unless a leave of absence is formally requested and approved by the student's adviser and the program chair. Advisers are under no obligation to provide advising support during terms when the student is inadequately enrolled. To petition for leave, students must be in good academic standing, and their application must be endorsed by the program Chair and filed to the Office of Graduate Studies no later than the Friday of the second week of the term for which the leave of absence should take effect. Leaves of absence cannot be approved retroactively.

Students who fail to enroll for *any* credits during three or more consecutive terms without approved leave (excluding summer) must submit a graduate re-enrollment request (http://www.pdx.edu/ogs/forms) to the Office of Graduate Studies. This form must be approved by the student's adviser and the program chair. At that point, if the adviser feels that the student's lack of enrollment has resulted in unsatisfactory academic progress, he or she may not approve of the re-enrollment, and the student will be dropped from the program. Doctoral students who apply to graduate will also be forced to pay retroactively for any gaps in enrollment during candidacy that were not approved under a leave of absence. Admission to the doctoral program is automatically cancelled if a doctoral student fails to enroll for three or more academic years without approved leave.

Residency requirements

Residency for doctoral degree programs (PhD, EdD) can be satisfied in one of the two following ways:

- Three terms of full-time enrollment (minimum 9 graduate credits applicable to the degree program each term) during the first two years after admission to the program. This may include a summer term.

- Six terms of part-time enrollment (minimum 1 graduate credit applicable to the degree program each term) during the first two years after admission to the program. This may include one or more summer terms.

Note: A doctoral student who was enrolled in the same major at PSU, and whose matriculation to the doctoral program immediately follows (within one calendar year) the master's degree program, may fulfill the residency requirement during the period in which he or she was enrolled in the master's program.

Transferring Credits from Other Institutions

In some cases, credit for graduate work done elsewhere may be transferred to fulfill program requirements. These courses must *not* have been earned through correspondence study, must have achieved a grade of B or better, and transferal must be approved by the student's adviser and the program chair. Residency requirements must still be met: For graduate certificate students, only 1 credit can be transferred (out of 16 the required), and for master's students two thirds of credit hours must have been taken after formal admission to the program. A seven-year time limitation also applies – credits transferred for a graduate certificate or master's degree must have been completed within seven years of when the degree is awarded – and students who take comprehensive examinations are expected to be familiar with, and may be examined on, material in current SYSC courses that are equivalent to any transferred courses that are included in the examination. Forms for requesting transfers can be found at http://www.pdx.edu/ogs/forms. Courses evaluated as part of comprehensive exams are automatically eligible for transfer.

Course Overlap between Degrees and Certificates

Coursework can often be shared between programs and certificates, so students who wish to pursue multiple degrees or certificates should ask their advisers how to best structure a program of study. Often students pursuing a doctoral or master's degree will also fulfill the requirements for a graduate certificate. When this happens, student can apply for graduation from the graduate certificate as early as the term where they will fulfill all certificate requirements and as late as their final term enrolled in the master's or doctoral program. However, students must have added the graduate certificate program at least one term before they apply to graduate from it, with form GO-19M or GO-19D, for master's and doctoral students respectively (see http://www.pdx.edu/ogs/forms).

Students pursuing doctoral degrees may also fulfill requirements for the master's degree. This is not automatically necessarily the case, because the list of courses that can fulfill requirements for a master's degree is more restrictive than the list of courses that can fulfill requirements for a doctoral degree. (See http://www.pdx.edu/sysc/approved-courses-ms-sysc.) Doctoral students who are eligible for a master's degree can apply for graduation from the master's program as early as the term where they will fulfill master's requirements, and as late as the term where they will fulfill doctoral requirements. However,

students must have added the master's program at least one term before they apply to graduate from it, with form GO-19D (see http://www.pdx.edu/ogs/forms).

Comprehensive Examination Requirements

Comprehensive examinations must be completed within 5 years of admission for doctoral students, and within 7 years of admission for master's students who choose the exam option. Exams are typically given during the 6th and 7th weeks of fall and spring terms, but may be scheduled at other times if agreeable to the exam committee. For master's students, two four-hour exams are taken, one per day, on Monday and Friday of the 6th week of the term, covering 32 credits of coursework. For doctoral students, three four-hour exams are taken, one per day, on Monday, Wednesday, and Friday of the 6th week of the term, covering 48 hours of coursework. Doctoral students who do sufficiently well on written exams are then scheduled for an oral exam during the 7th week of the term. If not otherwise enrolled in coursework, students may take research credits (SySc 501 or SySc 601) to maintain continuous enrollment while taking their exams.

In order to take comprehensive exams, the student and his or her adviser must identify several members to serve on the comprehensive examination committee. The committee must include at least three members for doctoral exams, and at least two members for master's exams. At least one examiner must be a core faculty member from Systems Science, and the chair of the committee, who will serve as the student's adviser during the examination process, must be familiar with the Systems Science examination process. One committee member must serve as the lead examiner for each exam area (including the chair who will be lead examiner for one area). Beyond the lead examiners, the student may identify contributing examiners for any areas. Students are advised to start planning for their exams early on, ideally asking instructors throughout coursework if they would be willing to serve on a future examination committee. For classes outside of the Systems Science program, a student might even ask an instructor about this before deciding to take the class.

Examination Proposal

The student and his or her examiners must agree on expectations for each examination. This is facilitated by the student writing a comprehensive examination proposal, with assistance from his or her adviser. The comprehensive examination proposal must be completed at least two months prior to the first written examination, so that the potential examiners can review it and assess its appropriateness for the student's degree and, for doctoral students, the anticipated dissertation research area. Once satisfied, the exam committee and the program Chair approve the proposal by signing the signature page.

To write the proposal, students can follow the template that is included in Appendix 2, on pg 26. The proposal should begin with a signature page for comprehensive exam committee members to sign, followed by a written statement that explains the rationale for the courses to be examined over. This statement should emphasize how the design of the proposal supports the student's intended research or career path by providing necessary substantive knowledge and/or methodological skills.

The proposal should then provide a page that summarizes all courses to be examined over. These courses should be grouped for each exam, specifying the course number (e.g., SySc 511), course name, instructor's

name, grade achieved, number of credits, and term in which it was completed. The list of courses may include up to 4 by-arrangement credits for master's students and up to 12 by-arrangement credits for doctoral students, so long as the credits were letter-graded (SYSC 505 or SYSC 605). The list may also include credits that a student requests to transfer from outside PSU, pending approval from the student's adviser and the program chair. At the bottom of the overview page, the student should summarize the total number of credits to be included and his or her cumulative GPA across those credits.

Next, the proposal should specify the details for each exam area on its own page. The page for each exam area must include the courses to be covered and the examiners for each course. The lead examiner must be specified, along with any contributing examiners. When contributing examiners are included, it should be clear which topics (i.e., courses) they will examine over. The student may also identify the weight of each course toward his or her performance in an exam area. When weighted equally, each credit of coursework accounts for approximately 15 minutes of examination material. But a student might adjust the distribution to as little as 12.5% (1/8) for a 4 credit course, or approximately 7.5 minutes per credit, if supported by his or her examiners and approved by the exam committee chair.

The student can request examiners to allow them access to book references, course notes, and the use of their computer during an exam. There may be other accommodations that the student will set up with individual examiners, such as the examiner providing a list of possible exam questions ahead of time. By default, exams are administered on the honor system, but an examiner may request the exam to be administered at the PSU testing center. The cost of this service is born by the examinee.

Usually the student will not need to include in his or her proposal a detailed list of topics to be covered for each course. However, if the student is including any by-arrangement credits, the exam summary must include a topic list to specify what will be covered in the exam and the reading list for each by-arrangement course must be attached to the exam proposal. Also, students are advised to look at course syllabi from the most recent offerings of courses to be examined over, and to make sure they have a common understanding with each examiner about what topics may be included. Examiners may require the student to be responsible for additional material beyond the syllabus, or an examiner may agree to a student's request not to include some topics or materials from the syllabus. Any expectations that vary from the most recent course syllabus should be clearly documented in the proposal. When additions and omissions are both relevant for a course, the student must explicitly list all topics and references for that particular course.

If there are no issues which need to be addressed by an in-person meeting of the committee, then the proposal can be approved by the committee members asynchronously. The student is responsible for obtaining the necessary signatures. The chair then reviews the proposal in its entirety and provides the final signature to confirm the proposal's completeness. If there are issues, or at the discretion of the committee chair, the committee will meet in person to finalize and sign the proposal. Once it has been signed by the committee members, the proposal will be checked and signed by the program chair.
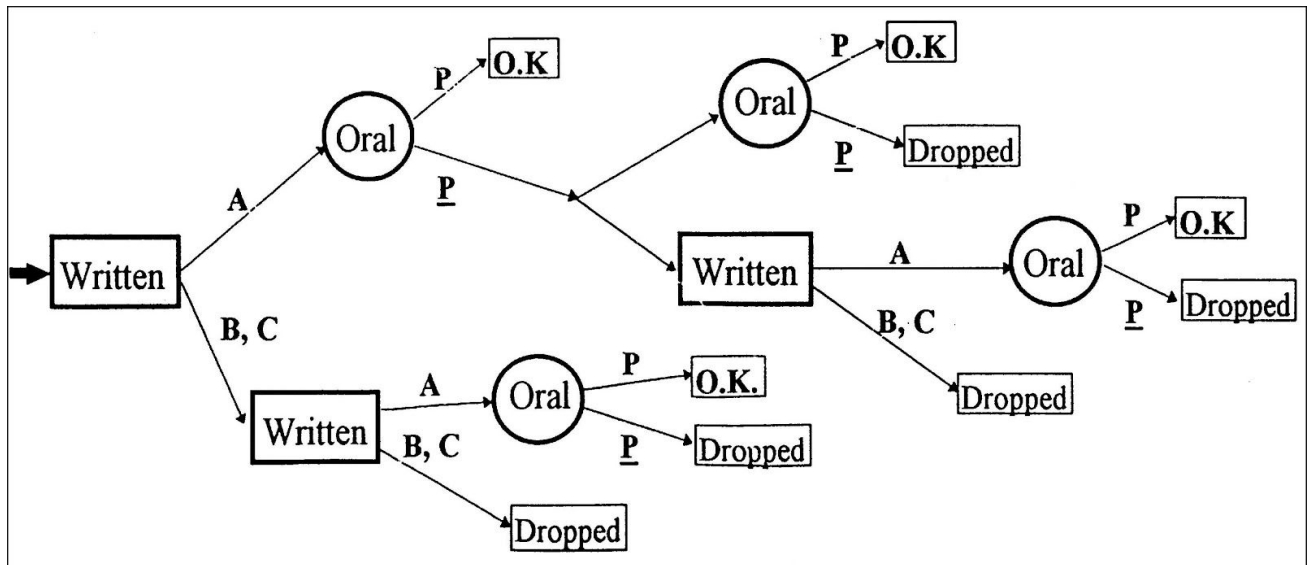
Examination Process

The student should convey basic information about the Systems Science comprehensive exam process to his or her examiners, to help the examiners to participate successfully. To facilitate this, students may use the letter template that is included in Appendix 3 on page 33.

Examiners must submit questions electronically to the chair of the comprehensive examination committee during the week preceding written exams. (The 5th week of the term). Each exam is graded by the examiner(s) as either Pass (P), Fail (F), or Marginal (M). In the early morning on each day a written exam is to be completed, the exam committee chair emails that day's exam to the student. The student completes the exam according to the agreed upon instructions, usually a single 4-hour period of the student's choice on each written exam day, and emails their answers to the exam committee chair. If scanning is required e.g. for drawings or sketches, that time is not included in the exam period. The exam committee chair emails the answers to the lead (and contributing) examiner(s). The exam committee chair is also responsible for collecting the results of all the written examinations from each lead examiner, and lead examiners are responsible for collecting results from contributing examiners within their exam area. Master's students who choose the examination option must pass one exam fully (P) and not less than marginally (M) on the other. If both exams are marginal or less, the student must retake them within one year of the initial exam period. Failure to achieve at least one full pass and one marginal pass after the second attempt will result in the master's student being dropped from the program.

Doctoral students may not take oral examinations until they have passed all exams with at most one marginal grade. If a student gets two marginal grades or one failing grade, he or she must retake the marginal and failed exams. If a student gets three marginal grades or more than one failing grade, he or she must retake all written exams. Students retaking exams must do so within one year of the initial exam period. If, upon retaking the exams, a student still has not passed them all with at most one marginal grade, he or she will be dropped from the program. This process is summarized below and in the figure on the following page.

Grades Received	Outcome
A. all P or one M	Student takes oral exam
B. two M or one F	Student must retake written exams not passed, and then take oral exam
C. worse than above	Student must retake all written exams, and then take oral exam

The chair of the examination committee will notify the student of the results of the written exams and the next steps the student must take. Students are not allowed to access to their graded written exams nor discuss their exam results with any examiners prior to the oral examination.

The oral examination is a meeting between the student, the chair, and lead examiners from the exam committee. (Contributing examiners do not attend.) Here, the student may be questioned over any material covered in the exam proposal, and they are likely to be asked follow-up questions about any areas of the exam where their answers were weak. Following the oral examination, the student will leave the room and each member of the exam committee must render a judgment, based on all information available to him/her, of the student's indicated ability, preparation, and promise for pursuing doctoral-level research and professional work. The assessment will be made using a number from 2 to 5, using the scale indicated below, via secret ballot. The scores will be totaled and averaged. To pass, the student must have a score larger than or equal to 3.8.

- 5   Exceptional demonstration of knowledge and capability
- 4   Satisfies expectations for a Ph.D. graduate student
- 3.5   Partially satisfies expectations
- 3   Well below expectations
- 2   Does not even partially satisfy expectations

The chair of the exam committee will announce to the student whether he or she passed the comprehensive examinations, will notify the program chair of the results, and will place a memo concerning the results in the student's file.

Thesis and Dissertation Requirements

Students preparing to complete a thesis or dissertation can enroll in research credits (SySc 501, SySc 601) to maintain continuous enrollment in the program while initializing their research. Once research has begun 503 or 603 credits may be taken.

Committee Formation

A student's adviser assists him or her in the appointment of a thesis or dissertation committee. The student finalizes their research topic, and develops it sufficiently by discussion with his or her adviser and prospective members of the dissertation committee. Once the topic is sufficiently developed, the student writes a research prospectus. This document describes the student's aim for thesis or doctoral research, the intended methods, and the expected contributions to systems science and other relevant fields. With support from the student's adviser, the research prospectus is shared with prospective committee members in order to "recruit" the committee. Often, the chair of exam committee agrees to be the student's dissertation adviser and therefore also chairs the dissertation committee, but depending on the dissertation topic, the student's adviser could change.

A dissertation committee must consist of four to six members, and a thesis committee must consist of three to five members. Dissertation committees must include a representative from the Office of Graduate Studies, who is a regular, full time tenured or tenure-track faculty, assistant professor or higher in rank, and is selected by the Office of Graduate Studies from a list of two potential members. Both dissertation and thesis committees also require a committee chair who is a full time tenured or tenure-track faculty at PSU, and at least one Systems Science full time tenured or tenure-track faculty to serve as a member. In some cases, at the recommendation of the program chair, OGS may approve a committee in which the core SySc committee member is not tenure-related. Note that the chair does not need to hold an appointment with Systems Science, but he or she must not be affiliated with the same department(s) as the Graduate Studies representative. The remaining members of the committee may include adjunct faculty, and can even include members from outside of PSU if their expertise is not available among PSU faculty and if the appointment is approved by the chair.

All members of a thesis committee must have at least a master's degree, and all members of a dissertation committee must have the terminal degree in their field, usually a doctorate (an exception is architecture). Committee members must be recognized researchers in a field appropriate to support the student's research. Typically, at least two committee members are affiliated with Systems Science, and at least one member must be a core faculty of Systems Science. The affiliation requirement can be relaxed by Graduate Studies, if appropriate, by request from the student's advisor. A formal Graduate Petition is not required. All members must be present for the approval of the research proposal and for the final defense of the thesis or dissertation. In some cases, committee members can participate via telephone or web technology.

Official committee formation is established by submitting the GO-16M form (for Master's) or the GO-16D form (for doctorate) to the Office of Graduate Studies, along with a CV for any committee members outside of PSU. For doctoral students, the GO-16D form is submitted as soon as their committee members are

identified. MS students who elect the thesis option and whose research involves human subjects in any way must complete the human subjects application (see below) before their GO-16M form is submitted.

Dissertation Proposal

Once the dissertation committee is formed, the student focuses on completing their formal dissertation proposal and being advanced to candidacy (see pg. 7) within three years of passing comprehensive exams. Students are advised to strive to complete and defend their proposal within one year after passing comps, if possible. The dissertation proposal is a substantial elaboration of the research prospectus, and should define the proposed research in detail, including each of the following:

1. General nature and present status of knowledge of the problem.
2. The theoretical and empirical framework within which the proposed problem exists.
3. The proposed contribution to knowledge/research question/hypotheses to be tested/…
4. The significance of the proposed research and its likely contributions.
5. The research methodology to be used.

Dissertation proposals are often organized into chapters for Introduction, Background, Methods, and Significance. If the research is empirical in nature, the methods section should an appropriate and clearly articulated research design. The proposal document must also demonstrate that the proposed research employs appropriate systems approaches and methods, and meets all University Requirements. These are outlined in the PSU Bulletin (see http://pdx.smartcatalogiq.com/en/2014-2015/Bulletin/Graduate-Studies/Degree-requirements/Doctoral-Degree/Dissertation-proposal for dissertations).

If the student is proposing to organize their dissertation in "3-paper" format (see the dissertation section later), then the proposal organization could be modified to show clearly that the body of the dissertation (Chapters, 2, 3, 4) will be Paper1, Paper2, Paper3 (each with its own background, methods, results, discussion), rather than Background, Methods, Results, Discussion.

If human subjects are to be used in the research (see below), the proposal should be developed with their protection in mind. The student is advised to be in touch with the Office of Research Integrity, so that after the research proposal is approved by the student's research committee, he or she can also gain approval from the Human Subjects Research Review Committee. The student may also need to be aware of approval processes for research involving animals, bio-safety, chemicals, radiation, or financial conflicts of interest. (See https://sites.google.com/a/pdx.edu/research/integrity.)

The student's adviser will provide feedback on drafts of the dissertation proposal. The student may also communicate with other committee members about their proposed research, but should not ask them to review rough drafts. When approved to do so by his or her adviser, the student provides a copy of their proposal to each committee member electronically (and on paper if requested by the committee member), and the committee convenes a proposal defense meeting. It is possible to schedule the proposal defense meeting before the proposal has been sent out, but committee members must have the proposal at least ten days prior to the meeting, and committee members may request an additional week for their review.

The proposal defense is a closed meeting between the student and his or her committee members. At this meeting, the student formally presents their proposed research (in about 30 minutes) and responds to questions from the committee. The student is then asked to leave the room, and the committee determines whether or not the proposal meets all requirements. The committee may require the student to make changes in the proposal. If the committee is satisfied with the proposal, committee members (and the Systems Science Program Chair) sign and submit a GO-23 form to the Office of Graduate Studies (see http://www.pdx.edu/ogs/forms). This form indicates the committee's approval of the student's proposal and requests that the student be advanced to doctoral candidacy. The GO-23 form can be signed immediately following the proposal meeting, but cannot be processed by the Office of Graduate Studies until the student has gained approval for any research that involves human subjects (see below).

Master's Thesis

A formal thesis proposal is not required by the university or the program, and typically the student works with their thesis advisor to flesh out their research prospectus to clarify their research aims and methods. Master's students may register for up to 5 of the 9 required thesis credits (SySc 503) before their committee has been appointed.

If the MS research involves human subjects, the prospectus becomes part of the supporting documentation for the Human Subjects application (see below), and, after a Master's student has received Human Subjects approval (or an exemption) their GO-16M form can be submitted to Graduate Studies. Master's thesis students must submit the GO-16M before being allowed to register for the final 4 of the 9 required thesis credits (SySc 503).

Human Subjects

Doctoral students doing research with human subjects must have their dissertation proposal approved by their committee before submitting their human subjects approval request to the Office of Research Integrity. (See forms at https://sites.google.com/a/pdx.edu/research/integrity/human-subjects.) MS thesis students need only to have a prospectus describing their intended research.

In fact, all research involving human subjects, whether conducted by faculty, staff, or students, must have prior approval of the Human Subjects Research Review Committee (HSRRC). This applies to all research under the auspices of the University, including surveys and questionnaires, whether supported by grant, contract, gift, University, or personal funds. Even if a student's research is exempt from full HSRRC review, the student must still file an application with the HSRRC. The decision to waive review is made by the HSRRC chair or a designated member of that committee. HSRRC applications may be obtained from the Office of Research and Strategic Partnerships. For expedited or full committee applications, the student and his or her adviser must complete required trainings before the application will be reviewed. Once the application has been submitted, the student should allow up to six weeks for the approval process.

Doctoral Candidacy
Doctoral students must advance to candidacy within three years of completing their comprehensive

exams. To advance to doctoral candidacy, students must have passed comps, formed a dissertation committee, had their research proposal approved, gained approval for research with human subjects, if applicable, and submitted the GO-23 form to the Office of Graduate Studies. Once advanced, doctoral students can register for the final 9 of the 27 required dissertation credits (SySc 603). The max number of 603 credits per term is 12.

Research Defense

For master's students, the final thesis defense must be completed within seven years of admission. For doctoral students, the final dissertation defense must be completed within five years of their advancement to candidacy. Students are encouraged to plan their schedules realistically, as it is easy to underestimate the amount of time it takes for this phase of the program. This is especially true for the "final stage" of writing up the results of research, as the writing process may reveal that a substantial amount of unanticipated and additional research work is actually required before the thesis or dissertation can be properly completed.

The student's adviser will provide the student with feedback on drafts of the thesis or dissertation. The student should also keep in close touch with all of his or her committee members, regularly updating them on progress and soliciting their guidance as needed. Minor deviations from the original proposal may be permitted at the discretion of the student's committee. But major modifications from the proposal may require a change in the student's committee, additional coursework, and, potentially a revised proposal and proposal defense. These additional requirements are made at the discretion of the committee. The student may request meetings with the full committee for discussion, evaluation, and suggested modifications of work in progress. But, as with the proposal stage, the student should not share drafts of the thesis or dissertation with committee members without approval by their committee chair.

For master's students, the thesis document will likely include sections from their prospectus (Introduction, Background, Methods, and Significance), with revisions, plus Results and Discussion sections that present the contributions from the student's work. Theses must also include an abstract of the work, which will be sent out as an announcement for the student's final defense of the thesis.

Doctoral students may choose follow this traditional format for their dissertation (Abstract, Introduction, Background, Methods, Results, Discussion, Conclusion), or they may organize their work into a "three-paper format" for easy dissemination into journal publications. With the three-paper format, three chapters constitute draft publications, each containing their own Background, Methods, Results, and Discussion sections. Dissertations in the three-paper format must also contain an Abstract and Introductory and Synthesis/Conclusion chapters that relate the student's work to the larger problem area and synthesize their contributions to Systems Science and other relevant fields. Specific requirements for the dissertation format are determined in consultation with the dissertation committee chair.

When the student and adviser believe that the thesis or dissertation is nearing its final form, they can schedule a pre-defense meeting with the student's committee. A copy of the thesis or dissertation (electronic and paper if requested) will be given to each committee member, who must be allowed a minimum of three weeks to read and evaluate it. After reviewing the document, the committee meets with the student to decide if the work is ready for public presentation and final defense. Like the proposal

meeting, the pre-defense meeting is a closed meeting between the student and his or her committee. At this meeting, the student may be requested to complete additional work before the final defense can be scheduled. But if the committee members are reasonably satisfied, the final defense is then scheduled, with the expectation that the student will address prior to the defense any changes requested by the committee.

At least two weeks before the final defense, the student must provide an updated draft of the final thesis or dissertation to all committee members. The abstract is published and distributed broadly amongst graduate students and PSU faculty, and the final defense meeting is open to the public. All committee members, or alternates approved by the Vice Provost for Graduate Studies, should be present for the final oral examination in person. Up to one regular member can attend via teleconference or videoconference, but the chair and Graduate Studies representative must be physically present for the formal dissertation defense.

At the defense, the student must formally present his or her research methodology and results, in an oral presentation that should not exceed 45 minutes. The presentation is followed by an oral examination by student's committee (including the Graduate Studies representative). The student must answer questions from the committee, demonstrating mastery of the field of specialization as it is related to his or her research, and defending the work as a worthy contribution to knowledge in Systems Science and any other relevant fields. The purpose of the committee's questioning and discussion is to: (1) clarify the significance and limitations of the research, and (2) determine whether the student has met University standards for the award of the master's or doctoral degree. Audience members are also invited to ask questions and share comments.

After the student's presentation and oral examination, the student and audience will be asked to leave the room for a short time. The committee must determine whether the student has satisfactorily completed the thesis or dissertation. This process is facilitated by the Graduate Studies representative, whose role is defined by documents provided to him or her by the Graduate Studies office. Each appointed member, including the Graduate Studies representative, may vote for pass or no-pass. For the student's final thesis or dissertation to be approved, there can be no more than one dissenting vote on the final examination. If the student does not pass, the student may be dropped from the program, or the committee may recommend that the Dean of Graduate Studies permit the student to have a second defense after a minimum of three months. (Results of a second defense are final.) The committee may also choose to pass the student subject to the completion of specified minor modifications to the thesis or dissertation.

Graduation

Each doctoral, Master's, and graduate certificate student must be registered for at least one credit hour during the term they wish to graduate. The student must also file a graduation application with the Office of Graduate Studies by the first Friday of the term in which he or she expects to graduate. This form is called the "Application for Awarding of Master's Degree, Doctoral Degree, or Graduate Certificate" on the Graduate Studies webpage of forms (see http://www.pdx.edu/ogs/forms).

Students who are defending a thesis or dissertation during a regular academic term (Fall, Winter, or Spring) and who wish to graduate in that same term must hold the final defense meeting by the sixth week of that

term and must submit their final thesis or dissertation document to the office of Graduate Studies by the eighth week of that term. The specific dates for any given term, including Summer, are available through the Graduate Studies website (http://www.pdx.edu/ogs/graduate-candidate-deadlines). Theses and dissertations must also follow specific formatting specifications and submission procedures, as outlined in the Graduate Studies website (http://www.pdx.edu/ogs/thesis-and-dissertation-information).

The enrollment history of doctoral students will be checked once they apply to graduate. If there were any gaps in enrollment following advancement to candidacy, students must register retroactively (and pay tuition) for at least one credit during each unenrolled term where a formal leave of absence was not granted.

Maintaining Admission

A student's admission to graduate certificates and degree programs may become threatened if he or she fails to maintain good academic standing and to demonstrate satisfactory academic progress.

Academic Standing

Academic standing is measured by a student's GPA, which is assessed as soon as a student has completed 9 or more letter-graded graduate level credits and for each term onward. Students who do not maintain a cumulative GPA of 3.00 are put on academic probation, and are notified by the Office of Graduate Studies. Students on academic probation are unable to graduate, to be admitted to a new or different graduate certificate or degree program, to be advanced to doctoral candidacy, to have a thesis or dissertation committee appointed, to receive or continue to hold a graduate assistantship, or to register for more than 9 credit hours in any term. Academic probation can be remedied at the University level if the student raises his or her cumulative GPA back to 3.00 within the next 9 letter-graded graduate credits that he or she completes. SYSC degrees and certificates require a GPA of 3.25 on courses applied to graduation. This is enforced at graduation, and no warnings are given for GPA below 3.25.

Students are disqualified from graduate certificates and degree programs if they fail to remedy academic probation within 9 letter-graded credit hours or if they become disqualified a second time. Disqualified students cannot register for any graduate courses at PSU, and may only petition for readmission to a graduate certificate or degree program after one calendar year. More information about graduate level Academic Standing can be found in the PSU Bulletin (see http://pdx.smartcatalogiq.com/en/2017-2018/Bulletin/Graduate-Studies/Enrollment/Academic-Standing).

Satisfactory Academic Progress

Students may be dropped from the program or prevented from graduating if they fail to make satisfactory academic progress. Progress requirements enforced by Systems Science (S) or by the University (U) via the Office of Graduate Studies. University requirements can be appealed through a Graduate Petition with the support of the student's adviser and the program chair, but there is no guarantee of approval.

Enrollment Requirements

- Enrollment during the first term of admission unless appealed through the Admissions Office (U)
- Continuous enrollment for master's students (S)
- Continuous enrollment for doctoral students before advancing to candidacy (S)
- Continuous enrollment for doctoral students after advancing to candidacy (U)
- Failure to enroll for three years without approved leave of absence (U)

Scholastic Achievement

- Upholding Student Code of Conduct (https://www.pdx.edu/dos/student-conduct-at-psu) (U)
- No more than one period of academic probation (U)
- Cumulative GPA of 3.25 for graduation with a graduate certificate (S) (U requirement is 3.00)
- Cumulative GPA of 3.25 for graduation with a master's degree (S) (U requirement is 3.00)
- Cumulative GPA of 3.25 for graduation with a doctoral degree (U)
- Successful completion of written comprehensive examinations by 2nd attempt (U)
- Successful completion of oral comprehensive examinations by 2nd attempt (U)

Timeline Restrictions

- Completion of Graduate Certificate credit requirements within seven years of admission (U)
- Successful completion of all master degree requirements within seven years of admission (U)
- Completion of doctoral comprehensive exams within five years of admission (S)
- Formation of a doctoral dissertation committee within one year of exams (U)
- Advancement to doctoral candidacy within three years of exams (U)
- Completion of all doctoral degree requirements within five years of candidacy (U)
- Completion of all doctoral degree requirements within twelve years of admission (S)

Students are notified by the Office of Graduate Studies if they have failed to meet any University level requirements. Students are notified by Systems Science faculty if their academic progress has been found to be unsatisfactory and is grounds for dismissal from the program. Before admission is cancelled, the student's adviser will send a notification of pending dismissal to the student's PSU email address, including a description of the unsatisfactory progress and an explanation of the potenial grounds for dismissal. When possible, the student will also be notified in person. Once the student has been notified, he or she has a period of four weeks to respond to this notification, preferably by email.

In some cases, the student may have the opportunity to prevent the dismissal by showing improvement or by petitioning for a timeline extension or an exception to degree requirements. To avail himself or herself of any opportunities, the student must respond to the notification within four weeks of receiving it. Students who fail to respond within this time period will be dropped from the program. Student requests to show improvement and cancel dismissal will be considered by the student's adviser and the program chair. The student will be notified of any decision to dismiss the student after considering his or her response, at

minimum via PSU email and also in person when possible.

If the student's request to cancel dismissal is approved, the adviser and program chair will initiate an appeals process through the Office of Graduate Studies. In this process, the Dean of Graduate Studies will be asked to review the student's academic progress, the student's request to remain in the program and his or her plan for demonstrating improvement. The Dean will seek input from the Graduate Council before making a recommendation to the Provost. The student will be notified of the outcome of the appeals process, at minimum via PSU email and also in person when possible.

Appendix 1:
Summary of Degree Requirements (Table)

Degree Option	PhD Core Option	PhD Multidisc. Option	MS Exam Option	MS Thesis Option	MS Coursework Only Option	Graduate Certificate
Exam 1 Minimum Requirements	16 credits of SySc	16 credits of SySc	16 credits of SySc	NA	NA	NA
Exam 2 Minimum Requirements	16 credits 12 SySc– prefix	15 credits of Field 1	16 credits 12 SySc– prefix	NA	NA	NA
Exam 3 Minimum Requirements	15 credits of Field 1	15 credits of Field 2	NA	NA	NA	NA
Total Credits Required for Examinations	48	48	32	NA	NA	NA
Min SySc prefix credits excl. 503/603	32	24	24	24	32	8
Max. by–arrangement crdits to meet abov			0	0	4	0
Total Credits Required for Candidacy	57	57	NA	NA	NA	NA
Exam Timeline Restrictions	Within 5 years of admission	Within 5 years of admission	Within 7 years of admission	NA	NA	NA
Research Committee Timeline Restrictions	Within 1 year of exams	Within 1 year of exams	NA	NA	NA	NA

Proposal Timeline Restrictions	Within 3 year of exams	Within 3 years of exams	NA	NA	NA	NA
Defense Timeline Restrictions	Within 5 years of proposal	Within 5 years of proposal	NA	Within 7 years of admission	NA	NA
Total Credits Required for Graduation	84	84	45	45	45	16
Max by-arrangment credits	8	4	4	4	4	NA
Min seminar credits	3	1	1	1	1	NA
Max seminar credits	6	4	3	3	3	NA
Graduation Timeline Restrictions	Within 12 years of admission	Within 12 years of admission	Within 7 years of admission	Within 7 years of admission	Within 7 years of admission	Within 7 years of admission

Comprehensive Exam Proposal Template

Your Name
Comprehensive Exam Proposal
To be Taken week of Month X-X, 20XX

Portland State University
Systems Science Program

Examiners: please email your questions to the Chair of the Exam Committee during the week prior to the written exams)

Exam Committee
XXX XXXX: _____ Date: _____
(Chair)

XXX XXXX: _____ Date: _____

XXX XXXX: _____ Date: _____

Wayne Wakeland:_____ Date: _____
Program Chair

ONE PAGE STATEMENT EXPLAINING HOW THE EXAM AREAS (& COURSES INCLUDED IN THEM) RELATE TO THE STUDENT'S RESEARCH INTERESTS & HIS/HER FUTURE PLANS.

Exam Overview

Course #	Course Name	Instructor Name	Grade	Credits	Term
Exam # 1 Name of Exam					
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Total Credits for Exam 1:					

Course #	Course Name	Instructor Name	Grade	Credits	Term
Exam # 2 Name of Exam					
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Total Credits for Exam 2:					

Course #	Course Name	Instructor Name	Grade	Credits	Term
Exam # 3 Name of Exam					
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Total Credits for Exam 3:					

Total Credits Across All Exams:	
Total GPA Across All Credits:	

Non-SySc courses can replace SySc courses to the limit allowed by SySc Procedures (Appendix 1).

Exam 1 Details

Exam #1 Name of Exam Area					
Lead Examiner Name:			**Lead's Department/Affiliation:**		
Course #	Course Name	Examiner		Department	Weight (%)
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Notes	Specify here if exam does not allow use of laptop, internet, books, or unlimited notes (if notes are restricted to X pages, specify X and whether or not they are to be turned in with the exam). Unless mentioned here, there are no restrictions on the non-human resources that can be used. Obviously all exams are to be done by the student alone.				

By arrangement courses, courses transferred from outside PSU, and any other courses that don't have regular PSU numbers need to be documented with syllabi, or topic and reading lists, either on this page or as clearly labeled appendices to the Exam Proposal (see instructions on page 12).

Exam 2 Details

Exam #2 Name of Exam Area					
Lead Examiner Name:			**Lead's Department/Affiliation:**		
Course #	Course Name	Examiner		Department	Weight (%)
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Notes	Specify here if exam does not allow use of laptop, internet, books, or unlimited notes (if notes are restricted to X pages, specify X and whether or not they are to be turned in with the exam). Unless mentioned here, there are no restrictions on the non-human resources that can be used. Obviously all exams are to be done by the student alone.				

By arrangement courses, courses transferred from outside PSU, and any other courses that don't have regular PSU numbers need to be documented with syllabi, or topic and reading lists, either on this page or as clearly labeled appendices to the Exam Proposal (see instructions on page 12).

Exam 3 Details

Exam #3 Name of Exam Area					
Lead Examiner Name:			**Lead's Department/Affiliation:**		
Course #	Course Name	Examiner		Department	Weight (%)
SYSC XXX					
SYSC XXX					
SYSC XXX					
SYSC XXX					
Notes	Specify here if exam does not allow use of laptop, internet, books, or unlimited notes (if notes are restricted to X pages, specify X and whether or not they are to be turned in with the exam). Unless mentioned here, there are no restrictions on the non-human resources that can be used. Obviously all exams are to be done by the student alone.				

By arrangement courses, courses transferred from outside PSU, and any other courses that don't have regular PSU numbers need to be documented with syllabi, or topic and reading lists, either on this page or as clearly labeled appendices to the Exam Proposal (see instructions on page 12).

Appendix 3:
Draft Student Letters to Comprehensive Examiners
For Lead Examiners

Dear _____,

Thank you very much for agreeing to serve on my comprehensive exam committee. This email contains some basic information about your participation in the comprehensive exam process.

Systems Science comprehensive exams are taken in-house (never take-home), during a time and date that is specified by the program. Multiple exams are grouped into an "exam area" that I will complete during a four-hour scheduled exam period. Your exam(s) for me will cover (course(s)) for my _____ exam area(s).

- Your exam covering (course) will account for _____% of my _____ exam area, and should take about _____ minutes to complete.
- Your exam covering (course) will account for _____% of my _____ exam area, and should take about _____ minutes to complete.
- Your exam covering (course) will account for _____% of my _____ exam area, and should take about _____ minutes to complete.

During the Fall//Winter/Spring quarter of 20__, comprehensive exams will be held. The written exams will be given on the week of Month/Day, with oral exams the following week. Please submit all exam questions to (chair name), the exam committee chair, no later than Friday the week before the exams,.

Electronic copies of my completed exams will be sent to you and to all contributing examiners as soon as I complete them. (Contributing examiner name(s)) will review their portion of the exam, and will provide a summary grade and % score to you within a few days. You must notify (chair name) of the overall grade on your overall exam area – as Pass, Fail, or Marginal – by Monday of the week following the written exams, taking into account the grades from contributing examiners. (Chair name) will then determine whether I have done sufficiently well to proceed to the oral exam and will notify me and all lead examiners. A tentative oral exam time will have been previously arranged by the committee chair, working with me and the other lead examiners. Please note that I am not allowed to see any graded exams under any circumstances, or to talk with you about my performance on written exams before the oral examination meeting.

Thanks again for helping with my comprehensive exams. Please feel free to ask me or (chair name) any questions about the comprehensive exam process.

Sincerely,

Your name

NOTE TO EXAM COMMITTEE CHAIR: Be sure to schedule a tentative oral exam several (4-6 weeks) prior to the written exam week.

For Contributing Examiners

Dear <mark>_____</mark>,

Thank you very much for agreeing to serve on my comprehensive exam committee. This email contains some basic information about your participation in the comprehensive exam process.

My written comprehensive exams will be taken during the week of MMM DD. Each exam are is typically four hours in length, can can be longer at the request of lead examiner.

Each written exam can include one or two sub-exams (usually over the material in one or two courses) examined by different examiner than the lead examiner for a given written exam area. Your sub-exam in my case will cover <mark>(course(s))</mark> as part of my exam in the <mark>_____</mark> written exam area, for which the lead examiner is <mark>_____</mark>.

- Your sub-exam will represent <mark>_____</mark>% of my <mark>_____</mark> exam area, and should be designed to take about <mark>_____</mark> minutes to complete.

Please submit your exam questions to <mark>(chair name)</mark>, the exam committee chair, no later than Friday the week before the exam, <mark>(date of Friday before exam week)</mark>.

An electronic copy of my completed sub-exam will be sent to you immediately after I complete them. Please review it as soon as you can, ideally within the next couple of days. Your summary grade on the sub-exam of Pass, Fail, or Marginal, as well as a % score to facilitate aggregation by the lead examiner, should be sent to <mark>(lead examiner name)</mark>, <mark>(He/She/They)</mark> will need your grades promptly, as <mark>(he/she/they)</mark> must report a grade for the overall exam area that incorporate your evaluation to <mark>(chair name)</mark> no later than Monday of the week after the written exam week. Please note that I am not allowed to see any graded exams or to talk with you about my performance on the exam before I have completed my oral examinations.

Thanks again for helping with my comprehensive exams. Please feel free to ask me or <mark>(chair name)</mark> any questions about the comprehensive exam process.

Sincerely,

<mark>Your name</mark>