SIMS Ph.D. Program

1 An overview of the SIMS Ph.D. program

The School of Information Management and Systems offers a Masters degree and a Ph.D. degree. The Masters degree is a professional degree while the Ph.D. is a research degree. The Masters degree develops the skills and knowledge to manage information in a wide range of institutional and professional settings. The Ph.D. program requires a mastery of the literature and practice in the broad area of Information Management and Systems (IMS): in-depth knowledge of three specific areas of concentration; skills in problem solving and the analysis of information; and the capacity to make original contributions to the field. To develop these abilities, the Ph.D. program has the following components:

- Education in the various fields of IMS
- Detailed knowledge of a specialty or research concentration
- A significant original contribution to the field

This corresponds to a layered model of graduate studies — students begin by developing a broad base of knowledge, and, building on that, progressively deeper understanding and skill in fields of increasing specialization:

These principles — a focus on preparing students for original research by developing a broad foundation followed by increasing specialization — guide the design of the Ph.D. program in IMS. While SIMS offers a structured curriculum to develop research capabilities and skills, the program is also flexible, in recognition that each individual student’s program will be unique.

1.1 The culture of the SIMS academic community

The maintenance of the SIMS academic community is the mutual responsibility of students and faculty. Doctoral students are collaborators in the academic research enterprise. In addition to its formal curriculum and requirements, SIMS is guided by the following shared values and expectations.
• **Open dissemination of research results.** The university is an open environment, not an environment for developing private work. Research work is measured by its impact on the broader scholarly community — without publication and dissemination, research work will have limited impact. Students should maintain web pages to keep the SIMS community, and as appropriate, the wider scholarly community, aware of their activities. Whenever possible, research papers should be distributed through technical reports and web publication. When it reaches professional quality, students should actively disseminate their research results by publication in the scholarly and scientific literature and presentation at the leading research conferences.

• **Participation in the intellectual life of the school.** SIMS is a community in which students participate by attending seminars and talks, and by presenting their own work to the School, as appropriate. Such activities extend students’ and faculty’s understanding, help define and unify the field of IMS at Berkeley, and prepare students for job talks, for conference presentations, and full participation in the larger research community.

• **Service.** As new members of a profession or discipline, doctoral students participate in creating a sense of community through service to the School and beyond by, for example, serving on Committees, giving feedback to other students about their work, and helping coordinate SIMS events.

• **Regular interaction with faculty.** Mentoring and apprenticeship is at the heart of the Ph.D. learning process. Each student shall meet regularly with his or her academic Advisor and faculty Advisory Committee. Weekly meetings with the Advisor are possible, and often typical.

• **Active involvement in research.** Students are involved in the world of research from the day they enter SIMS; indeed, the admissions process centers on the quality and focus of an applicant’s research interests. The life of the researcher is a continuous process of seeking new ideas, finishing tangible research products, and presenting them to others. Of course, these results will vary depending on the student’s interests and stage of preparation.

• **Collaborative work.** Research is largely a collaborative process. Students are expected to actively engage in collaboration with faculty and fellow students, and to develop collaborative skills.

• **Ethical considerations.** All members of the SIMS community are expected to maintain the highest standards of intellectual integrity and ethics. This includes respect for other researchers, full intellectual honesty in reporting on one’s own work, correctly citing prior work, adhering to appropriate standards for research, presenting information on published experimental results, and avoiding conflict of interest or the appearance of conflict of interest.
1.2 Competencies

There is no foreign language requirement in SIMS. Rather, mastery of a foundation set of skills and competencies needed for success in IMS disciplines is required. Normally students will develop the following vital skills through coursework.

- **Research**: The ability to design and implement research projects, including gathering, analyzing, and interpreting qualitative and quantitative data, including statistical data.
- **Expository**: The ability to clearly express oneself in scholarly, professional or scientific publications and in oral presentations.
- **Critical**: The ability to critically read and assess research.
- **Computational**: The ability to use and program computers used in information systems.

The School takes these competencies seriously, and, as discussed below, students are required to complete this competency requirement as part of the Prelim process.

1.3 Guidance of the Ph.D. program

The Ph.D. program is supervised by the Head Graduate Advisor and the Ph.D. Program Committee, which currently consists of all SIMS ladder faculty.

1.4 The Advisor and the Advisory Committee

On entering the program, each student is assigned a temporary faculty Advisor. In consultation with this Advisor the student forms an Advisory Committee of three UCB faculty members, at least two of whom should be regular SIMS faculty; usually the committee is formed by the end of the first year. This Committee should represent a range of fields of study, reflecting the student’s Major and Minor fields, as described below. The Head Graduate Advisor reviews the breadth and disciplinary composition of the Committee. The Advisory Committee will help the student design his or her coursework, and certify that the student has mastered the core set of competencies outlined above. Within the first two years, the student should choose a permanent faculty Advisor.¹

1.5 Monitoring student progress

Guidance by the Advisory Committee is intended to provide students with feedback and expertise necessary for making normal progress towards the Ph.D. degree. Each semester, each student will prepare a statement describing his or her program and its direction, accomplishments for the current semester, and goals for the coming semester. The Ph.D. Program Committee will meet to review these reports, discuss students’ progress with the Advisor, and prepare a letter for each student reporting on what the faculty sees as the significance of the student’s accomplishments and goals. If a student is not making satisfactory progress, the committee will make specific recommendations to help the student return to good standing as part of the semiannual review.

¹Under rare circumstances, the school may support a student petition to the Graduate Division for an Advisor who is not a regular member of the SIMS ladder faculty. If the permanent Advisor is not a regular SIMS faculty member, a regular SIMS faculty member must serve as a co-Advisor. See the Graduate Advisor’s Handbook: Degrees for the governing campus regulations.
This evaluation is both quantitative and qualitative. Quantitative standards are:

- SIMS requires a 3.5 cumulative grade point average across all graduate courses taken.
- SIMS courses must be taken for credit with a cumulative 3.5 GPA in SIMS courses.
- Students may not accumulate more than one incomplete at a time, other than for reasons of illness or emergency (requiring written notification of the Graduate Advisor).

Qualitative standards, such as “normal progress towards the degree,” will be defined in writing each Semester by the student’s Advisory Committee and the Ph.D. Program Committee. The normative goal of the program is that students will complete the qualifying exam requirement in 8 semesters, and the Ph.D. dissertation in 12 semesters.

Failure to make normal progress towards the degree, as measured by these standards and processes, will result in a request to the Graduate Division that the student be placed on probation. The probation letter will state specific requirements that must be met for the student to return to good standing, and a reasonable timetable for meeting these requirements. Failure to meet these requirements in due time will result in dismissal from the program.

As Graduate Division guidelines provide, students who withdraw from the program or fail to enroll must apply for re-admission. Re-admission is not guaranteed, therefore students should consult with their Advisory Committees and notify the Head Graduate Advisor before leaving. In order to be re-admitted, a statement of goals and research interests must be filed, and the Head Graduate Advisor must certify that the student is in good standing, or has a realistic plan and intention to do so quickly.

2 Coursework and the Preliminary Project

In the first years of coursework, students gain a broad background in IMS, then acquire an in-depth understanding of one Major and two Minor specific discipline or research areas, and complete a Preliminary project paper. The following principles and structures frame an educational process that meets most students’ needs most of the time. In practice, these principles are flexible, and most rules may be waived with the approval of the Head Graduate Advisor after consultation with the student’s Advisory Committee and interested faculty.

Because IMS is an inherently interdisciplinary field, the appropriate program for any one student needs to be worked out with his or her Advisory Committee. Some fields, for example, are more structured, and a sequence of courses can be defined. Other fields are inherently less structured, and the student will be encouraged to draw on a wide range of faculty and campus resources within and outside of SIMS. However, in the interests of equity and clarity, this document presents the general outline of a likely program that would challenge a student and result in reasonable progress toward the Ph.D. degree. Each student should actively work with his or her Advisor and faculty Advisory Committee to develop the set of courses that will prepare him or her in both the broad area of IMS and their proposed Major and Minor specialties. Each student is strongly advised to consult with his or her Advisory Committee as early as possible to start the process of planning his or her customized course curriculum.
2.1. Coursework

In order to gain a broad foundation in IMS as well as detailed background knowledge sufficient to prepare to do research and master the competencies described above, each new student should:

- enroll in required core IMS courses;
- take the Doctoral Colloquium, IMS295, at least once, and attend one of the continuing research seminars in the School closest to your research interests; and,
- work with your Advisory Committee to identify and take a set of advanced courses tailored to your interests from SIMS and other departments on campus.

Each of these requirements is described in more detail below.

(a) Breadth. To gain a broad foundation in IMS, students who do not already have a SIMS master’s degree should take the core SIMS courses: IMS 202, 204, and 206. Students may substitute more advanced courses offered at UC Berkeley (See Appendix A).

(b) Explore and develop your research interests. Ph.D. students are expected to enroll in the Doctoral Colloquium IMS295 in their first semester, and attend one of the continuing SIMS research seminars each semester. This requirement may be fulfilled by a research seminar in another department, with the approval of the student’s Advisor, but students are still expected to actively participate in the intellectual life at SIMS. IMS295 may be substituted for the seminar requirement for up to two semesters during the student’s pre-candidacy period.

(c) Master three subject areas. Mastery of three subject areas is required for the Qualifying Exam. The preparation is usually done by means of coursework in three areas, one Major and two Minor subject areas. IMS draws upon, or is embedded within, many other disciplines and professions. Depending upon the student’s focus, the process of specialization will normally require a mastery of at least one affiliated discipline, such as computer science, economics, law, political science, psychology, or various humanities and social science disciplines. This list is not exclusive; other fields may be appropriate. For example, a student doing research in medical information systems might wish to acquire a deeper understanding of public health issues. One of these subject areas should develop the foundations for a possible dissertation research topic.

- The Major subject area. The Major subject area requires a coherent program of at least 12 units of graduate courses or the equivalent, excluding IMS299, with a GPA of 3.5 or better. (Most students will take considerably more than 12 units in the Major area.) Up to one advanced course used to substitute for IMS202, 204, or 206 may count in this total, if it was taken for a grade.

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2 Students who have taken these courses at Berkeley within five years prior to entering the Ph.D. program at UC Berkeley will not be expected to retake them

3 Current SIMS fields of study are described in http://www.sims.berkeley.edu/programs/phd.html.
• **Minor subject areas.** Each Minor subject area is usually composed of at least six graduate\(^4\) course units. Each Minor subject area must have an orientation different from the Major program, and the courses in the Minor must primarily contain material that does not overlap with the Major program.

The student should maintain a minimum GPA of 3.0 in Minor fields, and only courses completed with a grade of B or above can count towards the course requirement. Up to one advanced course used to substitute for IMS 202, 204, or 206 may be counted.

Up to seven units of this twenty-four unit requirement may be fulfilled by IMS299 courses, however in each instance a structured course syllabus must be filed with the Advisory committee to count towards this requirement. Although there is no unit requirement for the Ph.D. at Berkeley, students may apply to the Head Graduate Advisor to have coursework completed at other schools substitute for the requirements for the Ph.D. The coursework must be at least at the level of graduate courses offered at UC Berkeley.

2.2 The Preliminary Project paper

As a capstone to the coursework, each student will submit a Preliminary Project paper to his or her Advisory Committee. The Preliminary Project paper should be a high quality, original work, such as the synthesis of literature about important issues in the field, or the presentation of an important problem and analysis of solutions. The paper should explore the student’s research interests in depth. The Preliminary Project paper must be unanimously approved by the Advisory Committee before the student may continue on to prepare a Dissertation Proposal and take the Qualifying examination. The Advisory Committee may accept a paper published while you are a student at SIMS (or paper accepted for publication), even if co-authored, as fulfillment of this requirement.

2.3 Certification of the competency requirement

Usually students will acquire the competencies described in Section 1.2 through coursework. Each student should confer with his or her Advisory Committee about how to demonstrate mastery. The student’s Advisory Committee will certify that he or she has gained the core set of skills discussed above. However, if the Advisory Committee is uncertain about the student’s skills in any of these areas, it has the option to impose additional requirements or exams. Students may request a review of such decisions by the Head Graduate Advisor and Ph.D. Program Committee.

2.4 Written summary report and synthesis of coursework

As part of the transition from coursework to the Dissertation, each student will prepare a written summary and synthesis of his or her work up to this point. The purpose of this is to give the Advisory Committee an overview of the student’s work, and to allow the student to reflect upon and synthesize his or her work up to this point. This is neither a Dissertation Proposal (see below) nor a comprehensive review of the literature (although it will contain references to the literature).

\(^4\) Upper division courses may not count towards the Minor unit requirement, although they may be required as prerequisites.
It is, rather, the student’s analytical and synthetic reflections on how his or her work ties together, the nature and shape of the Major and Minor fields, how the fields fit together, and the important research issues. It should not duplicate the Dissertation Proposal, though it may serve as a prolegomenon to it. The Advisory Committee may waive this requirement if it is satisfied that coursework has been well structured and the student’s understanding of the field is well integrated. This requirement reflects that students have the option to take a highly structured sequence of courses which is designed to be cumulative (e.g., a computer science sequence), or to invent an interdisciplinary field consisting of courses without a cumulative content other than that provided by the student; the written summary report is appropriate for the latter, but not the former.

2.5 Summary of requirements

Most students should complete these course requirements in about two years. However, because the program may be highly customized for each student, it is not possible to define a blanket timetable requirement other than the normative guideline described above. Thus, the Ph.D. Program Committee, in consultation with the student’s Advisory Committee, will decide whether he or she is making adequate progress towards the degree, and communicate specific requirements and recommendations in writing each Semester.

Summary of the procedure for meeting the requirements:

1. Identify a permanent Advisor and form an Advisory Committee to guide the work through the Qualifying Exam
2. Take IS 202, 204, and 206 (or substitute with approved courses; see Appendix A)
3. Participate regularly in seminars (including at least one semester in IS295 and regular participation in research seminars)
4. Complete courses in the Major and Minor fields
5. Receive certification of competencies (expository, quantitative, computational, critical) from the Advisory Committee
6. Write the Summary Report and Synthesis on coursework
7. Complete the Preliminary Project Paper

After completing these requirements, a student who does not already possess a MIMS degree may petition for a master’s degree, and for permission to take the oral Qualifying Exam. The MIMS degree requires that the student complete: (a) a program of 42 units of course credit, approved by the faculty, with an average grade of B or higher; and (b) a group project approved under conditions designated by the faculty.

If the student has demonstrated sufficient mastery of the field, the student’s faculty Advisory Committee (in consultation with the Head Graduate Advisor) will grant permission for the student to proceed to the oral Qualifying Exam. If the student has not demonstrated sufficient mastery of the field, the Committee may award the student a MIMS degree, but not grant permission to take the oral Qualifying Exam or to complete the Ph.D. program.
The Qualifying Exam

The intent of the Qualifying Exam is to ascertain the breadth of a student’s knowledge and preparation. Three fields are considered necessary for that breadth. The student should be able to exhibit knowledge and understanding of the fundamental facts and principles inherent in his or her fields of study. The exam also enables the faculty Committee to assess students’ preparedness for a research career. The faculty examiners will look for evidence that students have the ability to think incisively and critically about both the theoretical and practical aspects of the field. In SIMS, students are expected to present the topic for the Dissertation as part of the Qualifying Exam and answer questions about how they will pursue the research necessary to develop the selected topic. A typical Qualifying Exam lasts approximately three hours. Usually, the student takes the Qualifying Exam within one semester of having completed the requirements. If the student does not pass the exam may be retaken one time. A student must be registered to take the Qualifying Examination.

The Qualifying Exam Committee

The Qualifying Exam Committee consists of four faculty members. At least two must be from SIMS; at least one must be from another department, and up to two may be from another department. The chair and the designated outside member must be members of the Berkeley Division of the Academic Senate. Under campus regulations, the chair of the Qualifying Exam Committee cannot also serve as the chair of the student’s Dissertation Committee. (See Appendix B for procedures.)

The Dissertation Proposal

As part of the Qualifying Exam, the student prepares a Dissertation Proposal describing a plan for research that will be a significant original research contribution to the field of IMS. The written Dissertation Proposal normally includes:

- A concise problem statement that summarizes the central thesis.
- A motivation for the problem.
- A description of previous research in the area.
- A description of the relevance of preparatory coursework in the area.
- A summary of the course work done towards the Dissertation.
- A statement of how the student will attempt to investigate or support the thesis.
- A timetable for the student’s Dissertation work, and (normally) a list of deliverables.

Summary of the Qualifying Exam requirements

1. Meet the Graduate Division’s eligibility requirements
2. Meet the SIMS eligibility requirements
3. Form a Qualifying Exam Committee
4. Complete Dissertation Proposal
5. Pass the Qualifying Exam

The university regulations concerning the oral Qualifying Exam can be found in the Graduate Advisor’s Handbook.
4 The Ph.D. Dissertation

The Ph.D. Dissertation represents the cumulative accomplishment of the Ph.D. process. The Ph.D. Dissertation must be an original and significant contribution to research. Results from Ph.D. Dissertations are published (except in extremely rare or exceptional circumstances), as discussed below.

4.1. The Dissertation Committee

Shortly after passing the Qualifying Exam, the student forms a Dissertation Committee replacing the faculty Advisory Committee. The student’s Ph.D. Advisor chairs the Committee. The Dissertation Committee evaluates the Dissertation Proposal, and reviews and approves the final Dissertation. The Committee must include at least two regular SIMS faculty members and one Academic Senate member from another department on campus.

4.2 The Dissertation Proposal

After passing the Qualifying Exam, the student completes (with any needed revisions) the Dissertation Proposal. After the Dissertation Committee approves the proposal, and no later than the end of the semester following the one in which the Dissertation Proposal is approved, the student files an Application for Advancement to Candidacy. In approving this Application, the Head Graduate Advisor approves the Dissertation Committee as well.

4.3 Residency

Students must have been in academic residence for at least four semesters to qualify for a Ph.D. In order for a semester to count as academic residence, a student must enroll for at least 4 units of 100- or 200-level courses. (These 4 units do not necessarily satisfy the requirements for full-time study.)

The graduate division requires that students be registered during the semester in which the qualifying exam is taken. SIMS also requires that students be registered in the semester in which the dissertation is approved in order to present his or her findings to the scholarly community. This second semester requirement may be waived if the student presents good reasons why residence would be difficult, with the concurrence of the student's Advisor and the Head Graduate Advisor.

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6 The Ph.D. Advisor must be a member of the Berkeley Division of the Academic Senate. The chair may be a UC Berkeley faculty member outside of SIMS, upon the approval of the Dean of the Graduate Division, but in such cases, a regular SIMS faculty member will serve as a co-Advisor.

7 If the student’s Advisor leaves the university after the student has begun the Dissertation requirements, the student should consult with the Ph.D. Committee as to what course of action to follow. In some cases, the student and the Committee may decide to pick a new Advisor; in other cases, the student and the Committee may decide to keep the student’s original Advisor while choosing a regular SIMS faculty member to co-advice.
4.4 The Dissertation

After receiving approval of the Dissertation Proposal, the student continues the Dissertation research and writing. During this period, the student should meet regularly with his or her Dissertation Chair and report regularly to the Dissertation Committee. Each semester, the student prepares a summary of progress, supported by copies of any writing that he or she may have done.

In accord with the standards of his or her specialization, the student is expected to publish the Dissertation and Major results of the Dissertation research.

To share new knowledge with colleagues and prepare for job interviews, Ph.D. students present the principal results of their Dissertation research and take questions and challenges from the community on the Dissertation work; this requirement may be waived, per 4.3 above. The Dissertation Committee and other faculty members and students from the university community — both inside and outside SIMS — usually attend. This presentation informs the university community about the research that takes place at SIMS and provides the student with valuable preparation for other research presentations (including job interviews). This presentation generally takes place in the last semester in residence or in the semester in which the Dissertation is filed. It should be scheduled so that as many interested people as possible can attend.

When the Dissertation is completed, it must be approved and signed by all the members of the Ph.D. Committee. Upon successful completion of the Dissertation and all prior requirements, the student will be awarded the Ph.D.

4.5 Summary of Dissertation requirements

1. Form the Dissertation Committee
2. Complete the Dissertation Proposal
3. Have Dissertation Proposal approved by Dissertation Committee
4. Complete and have approved the application for advancement to candidacy
5. Meet the residency requirement
6. Complete the Dissertation
7. Make a public oral presentation of the Dissertation results
8. Receive sign-off by all Dissertation Committee members.
Appendix A  Courses that may be substituted for IMS required breadth courses

This appendix discusses recommended substitute courses for required IMS breadth courses. Because of the nature of this material, these recommendations will change frequently. The faculty will regularly revise this appendix, and students, prior to acting on recommendations suggested in this appendix, should consult with their Advisory Committees to make sure that the recommendations will still be accepted as valid substitutes.

The Ph.D. course breadth requirement is intended to help SIMS students gain an initial exposure to the wide range of topics that are relevant to IMS. From this foundation Ph.D. students can decide for themselves which areas of specialization they plan to pursue.

Currently the SIMS breadth course requirements are IS 202, 204 and 206. Ph.D. students must take courses that cover the content of the breadth requirements, but may take courses in those areas that are more advanced than the SIMS introductory series. The course substitution list that appears in this document will be reexamined and updated on an annual basis. Additionally, students can also negotiate exceptions with their Advisory Committee. Students should understand that these advanced courses are not offered with any particular regularity.

SIMS 202 can be replaced by a combination of two courses: an advanced course on Information Retrieval and an advanced course on either database design/implementation or information organization.

Courses that qualify are (for the Information Retrieval requirement) are:

- SIMS 240, Principles of Information Retrieval
- SIMS 296A-3 Current Topics in Information Access

Courses that qualify (for the Databases and Information Organization requirement) are:

- SIMS 257, Database Management
- CS 186, Introduction to Database Management
- SIMS 245, Organization of Information in Collections

SIMS 204 can be replaced by a set of courses approved by the current SIMS 204 instructor.

SIMS 206 may be replaced by an advanced course in distributed systems. Courses that qualify are:

- SIMS 250, Computer-based Communications Systems
- CS 268, Computer Networks

Additionally, Ph.D. students are required to take at least one semester of SIMS 295 (the doctoral colloquium). This course can be used to fulfill the seminar requirement for a maximum of two semesters during the student's pre-candidacy period.
Appendix B  Procedures for the Qualifying Exam.

Students must prepare and submit the Application for Qualifying Exam (yellow card) and a Program of Study for Doctoral Candidates (white card). The Application includes the names of the proposed Exam Committee members, and the date, time and place of the Exam. (It is the student’s responsibility to find a date and time at which all the members of the Exam Committee are available.) Both the white card and the Application must be approved by the Head Graduate Advisor. The yellow Qualifying Examination application form must be received by the Graduate Division at least three weeks before the date of the exam. The Graduate Division reviews the committee’s membership and proposed examination topics on behalf of the Administrative Committee of the Graduate Council. Students must not take the examination without prior receipt of a notice from the Graduate Division that the Exam has been approved.

If a student wishes to change the membership of the Exam Committee after the application has been approved by the Graduate Division, the Committee must be reconstituted by petition. A general petition signed by the Advisor must be submitted to the Head Graduate Advisor for forwarding to the Graduate Division.

The Graduate Division has the following eligibility requirements for taking the Qualifying Exam:

1. The student must be registered for the semester in which the exam is taken (an exam may be taken during the summer or winter breaks if the student paid fees for the semester immediately preceding the exam or intends to pay fees for the semester immediately following the exam).

2. The student must have completed at least one semester of academic residence.

3. The student may have no more than two courses graded Incomplete.

Additionally, SIMS requires a cumulative 3.5 grade point average for graduate work towards the Ph.D.