Computer Science Doctoral Degree Program Assessment Plan

Computer Science
University of Rochester

3 Sept 2011

A. Program title: Computer Science

B. Program degree: PhD

C. Program objectives and program learning outcomes

Program objective 1.

Program will prepare students to contribute as original and creative scholars in their field, demonstrated as follows.

1. Core knowledge, methods, and scholarship: Demonstrate knowledge in three core areas of computer science: Theory (complexity and algorithms), Systems (operating systems and programming systems), and Artificial Intelligence-Human Computer Interaction.
2. Specialized knowledge, methods, and scholarship: demonstrate comprehensive, in depth knowledge of the theories, methods and scholarship within one of the three areas above.
3. Creative synthesis and critical thinking: creatively synthesize broad areas of theory and scholarship in the field to generate new ideas or insights; analyze works in the field critically.
4. Research and Methods: Conduct skillful research: identify and synthesize relevant literature, make considered choices in design of a research study, and analyze resulting data.
5. Scholarship: Produce original, scholarly contributions in the field.

Program objective 2.

Program will prepare students to be successful and responsible professionals in their field, demonstrated as follows.

1. Written communication: Convey ideas or arguments in clear, concise, well organized papers.
2. Oral communication: Convey ideas in cogent, persuasive, and organized presentations.
3. Professional ethics: Appreciate the importance of and demonstrate a responsible, ethical manner in professional work.

4. Teamwork: Demonstrate ability to work with others on projects, including sharing work involved in development of initial ideas and a project plan, discussion of progress, and completion of work.

5. Teaching: Create and demonstrate well-organized lectures, classroom activities, assignments, tutoring, mentoring, and technology support that enable student learning.

6. Creativity and innovation: Demonstrate abilities in creativity and innovation through development of new computational methods and theoretical results.

7. Departmental and Global citizenship, broader impact: Demonstrate appreciation for ones role as a member of a small, diverse and cosmopolitan research academic department and an increasingly connected global society. Demonstrate awareness of its social, economic, technical, or ethical impact.

Program objective 3.

Program will prepare students to hold positions of leadership in academic, government, nonprofit and industry organizations.

1. Leadership: Demonstrate leadership through positions held in scholarly and other professional activities.

D. Program assessment: direct methods

The following methods will be implemented for each doctoral degree candidate at the appropriate stage of their tenure. All the results and resulting faculty review forms will be gathered in the student's file, and will be reviewed at the end of each semester in a full faculty meeting, the Plenary Advising Session (PAS).

1. Coursework builds breadth and depth in the first two years of the PhD program, and success is measured by grades, which also constitute the criterion for success in year one of the program (our equivalent of a comprehensive examination).

2. Qualifying exams, written or oral depending on the sub-field within the department, test for research potential and mastery of a specialized field sufficient to support PhD research.

3. The Area Paper is a critical and synthetic survey of a coherent sub-field or topic, and can include original research.

4. Six Month Reviews: twice annually before each PAS, each student accepted for Candidacy will present his progress to his PhD Committee.

5. Every semester, every student will make a Teaching or Research Assistant contract with a faculty member, who grades it at semester's end. Student may rebut.

6. Doctoral dissertation proposal, document and public defense, will be reviewed by the PhD. committee using the Doctoral Dissertation Proposal Review Form.

7. Doctoral dissertation, document and public defense, will be reviewed by the PhD. committee using the Doctoral Dissertation Defense Review Form.

8. Details of awards, fellowships and other distinctions given by the program, University of Rochester, or external organizations are continuously updated for PAS presentation.

9. Refereed journal and conference publications are reported by students and faculty, and details presented at the PAS.

10. Leadership positions held by enrolled students are similarly gathered for PAS presentation.

E. Program assessment: indirect methods

The following indirect methods will be implemented.

1. The Graduating Student Survey will be a web-based survey distributed annually by the UR College Director of Assessment. The survey will include questions that ask students to rate the importance of program learning outcome for career plans and to self-assess development of learning for selected program learning outcomes.

3. Post-graduation career data is also gathered continuously through the departmental Facebook account, public news, private sources, etc., and merged with survey data. The department publishes an annual newsletter with extensive alumni news.

F. Program assessment data review plan

1. Data gathered in Doctoral Dissertation and Proposal Review Forms, TA and RA contracts, and six-month review forms will be tabulated by program staff, presented at the next PAS.

2. Data gathered in Graduating Student Survey will be reported to the program's graduate committee by the College Director of Assessment, and reviewed (2012, 2013, every other year after that)

G. Alignment of program learning outcomes and program assessment methods

Outcome category	Program outcome	Assessment	Standard
Good Standing	Student maintains performance up to faculty expectations and appropriate to the individual.	All relevant factors (course grades, teaching, department service, research productivity, personal situation, etc.).	Each student in good standing after each PAS (3).
Core knowledge, methods, scholarship	Demonstrate comprehensive, in depth knowledge of the theories, methods, and scholarship in the field	DIRECT METHODS Coursework	Grade of B or better in each of three areas: theoretical computer science, computer systems, and artificial intelligence-human-computer interaction.
Specialization knowledge, methods, and scholarship	Demonstrate comprehensive, in-depth knowledge of the theories, methods and scholarship in their subfield of computer science: theory, systems, or artificial intelligence-human-computer interaction.	DIRECT METHODS Qualifying exam, Doctoral dissertation proposal – document and defense. Doctoral Thesis – document and defense.	Pass Qualifying exam at level of PhD Pass or High-Pass. Average score of 3 in "Previous work" criterion on proposal and dissertation defense (1).
Creative synthesis, Critical thinking	Creatively synthesize broad areas of theory and scholarship in generation of new ideas or insights. Critically analyze works in the field.	DIRECT METHODS: Doctoral dissertation proposal, Doctoral dissertation.	Average score of 3 on problem definition, solution plan, and "impact" criteria for proposal and dissertation defense (1).

Table 1: Alignment of program learning outcomes and program assessment methods, with (Note numbers)

Outcome category	Program outcome	Assessment	Standard
Research and Methods	Conduct skillful research including gathering, processing, interpreting scholarship. Make considered choices in design of a research study. Competently implement methods of analysis or investigation as part of research projects.	DIRECT METHODS: RA Contract, Doctoral dissertation proposal, Doctoral dissertation. INDIRECT METHODS: Graduating student survey,	Minimum of B on RA contracts. Average score of 3 for the criteria solution plan and evaluation plan in proposal, dissertation defense
Thesis Progress	Make adequate progress toward a timely dissertation submission.	Six-month reviews(1).	Review marked "satisfactory".
Written communication	Convey ideas or arguments in clear, concise, well organized papers	DIRECT METHODS: Area Paper, Doctoral dissertation and proposal (1). INDIRECT METHODS: Graduate survey	Grade of B on Area Paper. Score of 3 for the document criterion for proposal and dissertation defense (1). Survey results as above.
Oral communication	Convey ideas in cogent, persuasive, and organized presentations	DIRECT METHODS Doctoral dissertation and proposal. INDIRECT METHODS Graduate surveys.	Average score of 3 for oral presentation criterion on defenses, proposals (1). Survey results as above.
Scholarship	Students will produce original, scholarly contributions in their field	DIRECT METHODS Journal and conference publications. Awards and other distinctions. Competitive grants and fellowships. Internships. INDIRECT METHODS Graduate surveys.	Awards, Grants, and Internships, no standard. 90% of graduates have at least 1 paper in approved, peer-reviewed conference or journal. Survey results as above.

Table 2: Alignment of program learning outcomes and program assessment methods continued. With (Note numbers).

Outcome category	Program outcome	Assessment	Standard
Professional ethics	Appreciate the importance of and demonstrate a responsible, ethical manner in professional work.	INDIRECT METHODS Graduate and Alumni surveys.	Survey results as above.
Teamwork	Demonstrate ability to work with others on projects, including sharing work involved in development of initial ideas and project plan, discussion of progress, and completion of work.	INDIRECT METHODS: Graduate, alumni surveys.	Survey results as above.
Teaching	Well-organized lectures, classroom activities and assignments, effective mentoring and tutoring.	DIRECT METHODS TA contract. INDIRECT METHODS Graduate, surveys.	Minimum of B on TA contracts (1). Survey results as above.
Leadership	Demonstrate leadership through positions held in scholarly and other professional activities	DIRECT METHODS Student, alumni leadership roles data. INDIRECT METHODS Graduate survey.	Enrolled students, no standard. Survey results as above.
Creativity and Innovation	Demonstrate abilities in creativity, innovation, entrepreneurship through inventions, patents, publications, presentations, etc.	DIRECT METHODS Student, alumni data on relevant accomplishments. INDIRECT METHODS Graduate surveys.	Enrolled students, no standard other than the Scholarship outcome category. Survey results as above.
Departmental and Global citizenship, broader impact	Demonstrate appreciation for ones role as a member of a local scholarly community and an increasingly connected global society. Work demonstrates awareness of its social, economic, technical, or ethical impact.	INDIRECT METHODS Departmental: PAS (3). Global: Graduate surveys.	Dept: Enrolled students: in good standing in program (see category). Global: Survey results as above.

Table 3: Alignment of program learning outcomes and program assessment methods cont. with (Note numbers).

Table Notes

1. See attached Doctoral Dissertation Proposal, Defense Review, six-month review, and TA/RA semester contract forms.

2. Graduating Student Survey will be a web-based survey distributed annually by the UR College Director of Assessment. The survey will include questions that ask students to rate the importance of program learning outcome for career plans and to assess their development of learning for selected program learning outcomes.

3. The Plenary Advising Session (PAS) is an all-day full-faculty meeting at the end of each semester in which every student's achievements and problems (and every advisor's problems) are assessed and addressed. All objectives and assessments mentioned above, as well as personal problems, proclivities, plans, personalities, research style, limitations, talents, etc. are reviewed and taken into account based on facts (e.g. health, year in program), student input, advisor's assessment, and other faculty's opinions, observations, and critiques. All factors are considered in a balanced, individualized manner with the goal of helping the student achieve his potential as an individual, creative researcher. and of helping the advisor mentor the student. Each student gets a letter with faculty's suggestions (or demands) and congratulations for recent achievements. The worst outcome for a student is the loss of good standing in the department (which can imply loss of support).