

Cognitive Science Graduate Program Guide

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1 USEFUL LINKS

Class Hour Schedules:	Link
Office of Graduate Education	1516 Peoples Ave [8:30AM-4:30PM]	Link
Office of Graduate Education Forms	.....	Link
Registrar Forms	.....	Link
Rensselaer Catalog	.....	Link
Academic Calendar	.....	Link
Academic Regulaions	.....	Link
Course Descriptions	.....	Link

Note that the requirements in this document emphasize those specific to the Cognitive Science Doctoral and Masters programs. These requirements are in addition to those discussed by the Office of Graduate Education at:

- OGE Masters: [OGE Masters](#)
- OGE Co-Terminal: [OGE Co-Terminal](#)
- OGE Doctoral: [OGE Doctoral](#)

2 M.S. REQUIREMENTS

The Masters of Science in Cognitive Science requires the completion of coursework selected with the guidance of the Faculty Advisor as well as the completion of a Masters Thesis or Masters Project under the guidance of a Masters Committee headed by the Faculty Advisor. In addition, all Masters students are expected to complete the Research Qualifying Exam (see below) within the first two semesters of the program.

Applications for the Masters of Science in Cognitive Science will be accepted from:

- Doctoral students in the Cognitive Science program whose Faculty Advisor recommends or requires the completion of a Masters Thesis as a prequel to work towards a Doctoral Thesis.
- Doctoral students in other Rensselaer Doctoral programs who wish to work with Cognitive Science Faculty to acquire expertise in cognitive science research methods and domain theories which complement those in their home discipline.
- Rensselaer undergraduates admitted to the Cognitive Science "co-terminal program." For general information about the co-terminal program see: <http://gradoffice.rpi.edu/update.do?catcenterkey=33>. For specific information see: <http://www.rpi.edu/dept/grad/docs/CoTerminal%20Rqmts.pdf> and contact the HASS Graduate Program Secretary

2.1 Types of Masters Students

2.1.1 MS: For Cognitive Science Doctoral Students

For students admitted to the Cognitive Science Doctoral program w/o a Masters, the Faculty Advisor may recommend or require the completion of a Masters Thesis as a prequel to work

towards a Doctoral Thesis. The instructional goal will be for the student to experience all parts of the dissertation process under the close guidance of the faculty advisor. In contrast to the doctoral degree, it is anticipated that the issues investigated and the methods deployed will be those recommended by the Faculty Advisor.

2.1.2 MS: For Other Rensselaer Doctoral Students

Students in other programs may wish to work with Cognitive Science Faculty to acquire expertise in cognitive science research methods and domain theories which complement those in their home discipline. This option is especially valuable for students who anticipate that their future research will touch on cognitive science theories or issues and might be greatly enriched by gaining an “insider’s” perspective on the skills, theories, and techniques required for cognitive science research.

2.1.3 MS: Co-Terminal Students

CogSci Majors. It is rare, but not unheard of, for Rensselaer undergraduates who are Cognitive Science majors to apply to the Co-Terminal program. Rensselaer Cognitive Science majors who are interested in pursuing a Ph.D. will be well-prepared to apply to Ph.D. programs in Cognitive Science at any major university in North America or Europe, including the Rensselaer Doctoral program.

Rensselaer Students who are NOT CogSci Majors. Rensselaer undergraduates who are not Cognitive Science majors but who have taken some coursework in Cognitive Science, Psychological Science, or Philosophy programs are encouraged to explore the Co-Terminal in discussions with a department Faculty and/or with the Graduate Program Director.

2.2 MS: Course and Credit Requirements

In common with the PhD program, all course sections are expected to be made in consultation with the faculty advisor (see Section 3.2). The typical number of credit hours for a MS in Cognitive Science is 30. All Masters students are expected to register for the weekly *Issues in Cognitive Science* seminar during each semester of the program and to register in their first year for the Cognitive Science Proseminar.

2.3 Research Qualifying Exam (RQE)

Co-terminal students are not required to complete the Research Qualifying Exam (but see 4).

2.4 MS: Learning Outcomes

The successful student in the Master of Science in Cognitive Science program will:

- (a) Cultivate a mentor-mentee relationship with a faculty member in that faculty’s area of expertise.
- (b) Demonstrate mastery of the research literature most relevant to the investigated topic.
- (c) Demonstrate understanding of the methodological approaches most appropriate to the topic as well as the threats to the reliability and validity of these approaches.
- (d) Conduct some combination of problem analysis, data collection, data analysis, and/or modeling (as appropriate to the research question of interest) under the guidance of the Faculty advisor

- (e) Produce a thesis or project following the form and format expected by other researchers in the area of interest (in consultation with the Faculty Advisor)
- (f) Present and defend the thesis in an oral presentation that is open to the academic community

2.5 Leaving the Program

Depending on the number of credits completed, Doctoral students who wish to leave the program prior to being awarded a Ph.D. may be offered the option of attaining a Masters Degree by completing a written Masters Project. Whereas the Masters Thesis requires successful investigation of an original research problem under close faculty supervision, the minimal Masters Project requires a written review of the literature selected by the student with faculty approval. For Cognitive Science Doctoral students, the Master Project is a terminal degree and precludes further work towards a Ph.D. in Cognitive Science.

3 Ph.D. REQUIREMENTS

3.1 OVERVIEW: Continuous, Annual, and Milestone Requirements

The PhD in Cognitive Science is the highest professional degree awarded by the Rensselaer Department of Cognitive Science. With it students may advance to university teaching and research, and to careers in industrial or government research, with a solid foundation of knowledge and an ability to carry through original investigations in Cognitive Science.

The major (1) annual and (2) continuous requirements, and (3) milestones in the Ph.D. program are:

- ANNUAL: Writing requirement
 - All Cognitive Science doctoral students are expected to write and encouraged to publish at least one paper each year.
 - This requirement may be fulfilled in a number of ways. Examples include:
 - * Survey paper written for the graduate advisor,
 - * 1st author paper submitted to a major research conference (there is no requirement that the paper be accepted),
 - * 1st author paper submitted to a quality journal (there is no requirement that the paper be accepted)
 - * Other major publication alternatives approved by the student's graduate advisor.
 - All such papers should be noted in the student's annual evaluation and registered with the Graduate Program Director (GPD).
- CONTINUOUS: Research Requirement
 - All students should be involved in research each semester, taking at least one research credit of *Readings in Cognitive Science* (COGS 6940), *Masters Project* (COGS 6980 – generally only for a terminal, non-Thesis Masters degree), *Masters Thesis*

(COGS 6990), or *Doctoral Thesis* (COGS 9990) each semester under supervision of their faculty advisor. For work on the *Research Qualifying Exam (RQE)*, students may register with their faculty advisor for 1-4 credits of COGS 6940 (Readings in Cognitive Science) and/or COGS 6990 (Masters Thesis – only for those students who expected to complete a MS on the way to the PhD – see Section 2) each semester until this requirement is completed.

- ANNUAL: Presentation at the Wednesday Noon Speaker series
 - Each graduate student is expected to prepare and deliver at least one research talk each Academic Year to the Department's Wednesday Noon Speaker series. It is expected that younger students will provide overviews of a research area of interest to them whereas older students will provide a research presentation.

3.2 PhD: Course and Credit Requirements

Course and research credits must be chosen with the advice and approval of the Cognitive Science advisor and must constitute a coherent plan of study reflecting the student's goals in obtaining a PhD in Cognitive Science.

Students must complete a minimum of 72 credits of coursework and research beyond the undergraduate degree.

- Each semester the student is expected to register for 2 credits in the weekly "Issues in Cognitive Science", Wednesday, lecture series.
 - All students are expected to complete one semester of the *Professional Seminar (prosem)*, typically in their 1st semester. This can be delayed by permission of the GPD and consent of the student's Advisor.
 - No student should take more than 12 credits each semester. Exceptions need to be okayed by the Graduate Advisor and approved by the GPD.
 - If the student has a prior MS, a total of 48 credits beyond the MS must be taken, including at least 12 course credits and at least 24 research credits. At least two thirds of the course credits must be at the 6000 level. Up to one third of the course credits may be 4000 level.
 - Students who complete the required credits before completing their thesis work will need to continue to register for research credits to maintain full-time status and will be expected to continue credits and participation in the weekly, "Issues in Cognitive Science", series. (Exceptions may be made for students who have completed *all but dissertation* (ABD) and have moved out of the Troy area for purposes of professional employment.)
- MILESTONE: Research Qualifying Exam (see Section 4)
 - by end of the 2nd or 3rd semester
 - Students enrolled in the MS program concurrently with the PhD program are expected to complete the first milestone, the *Research Qualifying Exam*, as the first

part of their MS thesis.

- MILESTONE (optional): Completion of Masters Degree
 - optional – see Section 2 above
 - by end of the 4th semester
- MILESTONE: Candidacy Exam & Dissertation Proposal
 - if *no* Masters in CogSci from Rensselaer, by end of the 3th year
 - if Masters in CogSci from Rensselaer, by end of the 4th year
- MILESTONE: Thesis Defense
 - if *no* Masters in CogSci from Rensselaer, by end of the 4th year
 - if Masters in CogSci from Rensselaer, by end of the 5th year

4 THE RESEARCH QUALIFYING EXAM (RQE) – (all PhD-only and MS Thesis students)

The RQE will be supervised by a committee consisting of the advisor and at least two other faculty members. The membership of the committee is informal and does not have to be approved by the Office of Graduate Education.

- Counts towards the annual writing requirement.
- Counts towards the annual presentation requirement.

Note that the RQE requirement for a terminal MS Thesis student (i.e., a student who is not continuing on for a PhD) may be waived at the recommendation of the student's Faculty Advisor with the approval of the Graduate Program Director. The RQE requirement for Doctoral Students can **not** be waived.

4.1 RQE: Committee Membership and Responsibilities

The RQE committee's sole responsibility is to approve the student's proposal for the Research Qualifying Exam and whether the student passes or fails the exam. Being part of an RQE committee precedes the formation of the masters or doctoral committee and does NOT imply that the faculty member has been asked or has agreed to be on either of those committees.

For students who expect to complete a:

- Masters Project – for Masters Project students, a RQE is not required and no committee is needed. (Before being accepted into the program, Co-Terminal students should discuss with their faculty advisor whether they should pursue this option or not.)
- Masters Thesis – it is recommended (but not required) that the three-person RQE committee be identical to their three-person Masters Thesis committee.¹

¹Please note that committee membership for the Masters or Doctoral Thesis is not determined until some-time after the RQE is completed.

- Doctoral Thesis but no Masters Thesis – it is recommended (but not required) that the three-person RQE committee include members expected to be on the student's doctoral committee.¹

4.2 RQE Options

There are two options for the RQE; (a) an integrative review of the technical papers in a research area or (b) the publication of an original research paper.

4.2.1 Integrative Review

The advisor, preliminary committee, and student prepare a list of 15-25 technical papers in the research area. The student must read and understand these papers, and provide an integrative review (not an annotated bibliography² of this body of work. These criteria are met by successfully completing two standard scholarly vehicles, a written paper and an oral presentation/exam.

4.2.2 Original Research Paper

Alternatively, in consultation with the advisor the student may elect to write a research paper with the goal of submitting that paper to a professional conference or journal. The student would be first author on this paper and take the lead in writing. In addition to the written paper, an oral presentation/exam is also required.

Both options require an iterative process of writing, reviewing, and rewriting with the first rounds between the student and advisor. The documents submitted to the advisor should be polished work, not the student's first draft. The advisor will review and provide feedback on no more than two iterations. The paper will then be sent, by the Advisor, to the committee.

On their 1st round, the committee may (a) make a preliminary approval, (b) decide that the work does not meet scholarly criteria, or (c) return the paper to the student for improvements and another iteration. It is expected that many, if not most, first round papers will fall into category c and will be returned to the student for further work. On the 2nd round, the committee may (a) approve the paper or (b) decide that the work does not meet scholarly criteria. On either round, if the committee decides a the student may progress to the Oral Exam or if the committee decides b the case will be forwarded to the GPD. Note that on either round, for an acceptable paper [category "(a)" above] the committee may make suggestions for improvements that do not require another round of reading and review. Also note that the committee's decision on paper quality is absolute, regardless of whether or not the RQE work has been accepted for publication by a conference or journal.

4.2.3 RQE: Oral Exam

After approval by the committee, the student will prepare for a public presentation and oral examination, with someone other than the research advisor chairing the exam. The presentation should be timed not to exceed 30 min. *Points of information* may be raised during the presentation as needed, but questions of substance will be deferred until after the 30 min presentation. After a period of questions by the committee and the audience, the committee will meet in private to discuss and vote on whether the student passes or fails. It is expected that

²If you do NOT understand the difference between an "annotated bibliography" and an "integrative review" be sure to discuss this point with your graduate advisor!

normally the Oral Exam will be part of the *Issues in Cognitive Science* Wednesday seminar presentations.

4.2.4 RQE: Registration

For work on the *Research Qualifying Exam (RQE)* students may register with their faculty advisor for 1-4 credits of COGS 6940 (Readings in Cognitive Science) and/or, if the student is pursuing a Masters Thesis (not Masters Project) 1-4 credits of COGS 6990, for each semester until this requirement is completed.

4.2.5 RQE: Timeline

Note that it is the responsibility of the student to keep the Graduate Program Director (GPD) appraised of the status of each of these steps.

- The three person committee (including advisor) should be formed during the first semester of the student's PhD program. With the advice and consent of the GPD, the committee members may be from any department at Rensselaer with up to one member being outside of Rensselaer.
- The preliminary reading list should be approved by the advisor, with input from the two committee members, by the end of the first month of the student's 2nd semester.
- The initial review and paper should be submitted to the graduate advisor by the end of the student's 2nd semester in the graduate program.
- Approval by the Advisor and the Committee of the paper (see **Written paper** above) should be completed by the end of the student's 3rd semester.
- The Oral Exam must be completed prior to the end of the 4th semester.
- Failure to complete any of these steps in a timely manner shall result in review headed by the GPD in consultation with the Advisor and Department Head, with a report being forwarded to the HASS Associate Dean for Graduate Studies.

4.2.6 RQE: Changes or Amendments

Any changes or amendments to this policy for individual students must be approved by the Advisor, GPD, and Department Head, in consultation with the HASS Associate Dean for Graduate Studies.

5 MILESTONE: PhD CANDIDACY EXAM & DISSERTATION PROPOSAL

- When
 - if *no* Masters in CogSci from Rensselaer, by end of the 3th year
 - if Masters in CogSci from Rensselaer, by end of the 4th year

For COGS, the candidacy exam is the dissertation proposal. Working with his or her advisor, the student spends the third year developing a detailed understanding of the chosen research area, and preparing a research proposal. It is expected that a student will schedule a Candidacy Exam near the end of year 3. The Candidacy Exam is an oral exam focusing on a thesis

proposal and administered by the student's doctoral committee. The student begins by presenting the thesis proposal and then is questioned by the committee. Other faculty may attend the exam, but do not vote on whether the student passes the exam. Faculty members not on the committee should make their intention to attend the exam known early so that a copy of the thesis proposal can be given to them.

5.1 PhD Year 4 and Beyond: Research Completion and Defense

After the candidacy exam has been passed, the student must complete the proposed research, write the dissertation, and defend the dissertation, all under the supervision of the student's advisor. Throughout this time, the student should continue to discuss progress and results with committee members to reduce the possibility of "surprises" during the defense. (At the end of this document, please see "Table 1 – Planning Timeline for Completion of PhD Dissertation.")

The dissertation defense is an oral examination that includes a presentation by the student of the major results in the dissertation. A student's doctoral committee establishes the specific format for this examination. The presentation of research results by the student is open to the public.

The defense should take place at least one year after the candidacy exam, in order to allow time to incorporate feedback from the candidacy exam. Students who wish to take the defense less than one year after the candidacy must contact the Graduate Program Director for approval.

The student is responsible for making sure that the dissertation is prepared according to Office of Graduate Education regulations. The Thesis Writing Manual defines these regulations.

5.2 PhD: Choosing a Doctoral Committee

The Ph.D. thesis is supervised by a single faculty advisor and overseen by a doctoral committee with at least four members. At least three of the members, including the committee chair (the student's primary advisor) must be Cognitive Science Department faculty. These faculty must be full-time, tenured/tenure-track faculty. Nominations of lecturers, research, and emeritus professors for the committee must be endorsed by the GPD and are subject to approval by the Dean of Graduate Studies.

The fourth member must be an "outside member." The outside member may be from outside Rensselaer, or may be an RPI faculty member whose primary appointment is not in the Cognitive Science Department. Students are encouraged to choose an outside member who is not a member of the RPI faculty.

Students may choose more than four members for their committee, if they wish. After students have chosen the members of their committee, they must fill out a Nomination of Doctoral Committee form. Students must get all committee members to sign the form.

For any committee members who are not RPI faculty members, you will also need:

1. The committee member's curriculum vitae. This must be included with the nomination of doctoral committee form.
2. A letter from the Graduate Program Director. The student's advisor must send a draft

letter to the GPD and Graduate Program Administrator detailing the qualifications and suitability of the proposed committee member for your PhD research topic. The GPA will work with the GPD on the letter and ask for clarifications as needed.

After the form is complete, including original signatures of the committed members, it must be delivered to the Graduate Program Administrator. The GPA will have the Department Head sign it. After the form has been signed, the GPA will put a copy in the student's file and send the original to the Office of Graduate Education.

If a student needs to change their committee membership, the student may submit another Nomination of Doctoral Committee form or the student may prepare a memo to be submitted by the department chair to the Graduate School.

If a member of a student's committee retires or otherwise leaves Rensselaer before the student's graduation, the person may continue to count as one of the full-time committee members if

1. The student graduates no more than one year after the professor's retirement, and
2. The department Head requests an extension from the Graduate School

6 PhD: PLANNING TIMELINE FOR COMPLETION OF PhD DISSERTATION

See next two pages for planning timeline.

Table 1 – Planning Timeline for Completion of PhD Dissertation: All times are countbacks from the date due to the Office of Graduate Education in the Semester you expect to graduate. **NOTE that “things change”**. Be sure to verify the OGE dates with those listed in the Academic Calendar for the semester you expect to complete your thesis.

Step	Description	Time	Comments
1	Dissertation records of completion due in OGE	0	See Academic Calendar for deadlines. (Note that this date changes from year to year)
2	Final Dissertation due to Advisor	-1 week	All changes must be completed to the Advisor’s satisfaction
	Dissertation approved by Advisor or sent back to candidate for more changes		Time variable – may not be completed in the semester submitted!
3	Dissertation to Advisor with changes incorporated	-4 weeks	If defense is successful the committee will suggest changes to the thesis. If defense is unsuccessful the clock is reset to the next semester
	Dissertation requires changes?		Many, if not most, dissertations require changes before the Committee is willing to sign off on it. Sometimes some or all Committee members will want to reread the changed parts prior to signing. Othertimes the Committee Members may tell the Advisor that they do not need to relook at the thesis but are OK to sign it once the Advisor approves of the changes
4	Oral Defense	-6 weeks	
5	Comments from the Committee to the Candidate		For PhD theses the changes suggested may be substantial. All candidates are strongly advised to discuss their dissertation with each committee member <i>before</i> their defense.
6	Draft of Dissertation to Committee (following approval by Advisor)	-8 weeks	The Committee needs to have a complete draft of the dissertation a minimum of 2-wk before the defense. Note that the requirements of individual committee members may vary on this. It is your responsibility to learn those requirements (by asking each Committee Member) to ensure that each one has the time available to read your dissertation

Continued on next page

Table 1 – *Continued from previous page*

Step	Description	Time	Comments
7	Final draft to Advisor	-10 weeks	Advisor needs time to approve the draft before it is sent to the Committee.
	Comments from Advisor & rewrites by the Candidate	Time variable – may not be completed in the semester submitted!	
8	Draft to Advisor	-13 weeks minimum time – your time may be longer	Expect a minimum of one and maximum of two iterations between Advisor and Candidate. [Your Advisor may allow more than two iterations before sending your proposal to committee but it is not recommended and if this is what you are expecting, be sure to verify this expectation with your advisor.] You should <i>not</i> expect your Advisor to be able to read and comment on your draft immediately!
9	Dissertation Proposal approved by Dissertation Committee	7 th semester	If your proposal is not approved by the end of your 7 th semester you should probably be considering a different career option!
10	Dissertation Proposal approved by Advisor (this approval may be written or oral)	5 th semester or later	
11	Dissertation Committee formed in consultation with Advisor	5 th semester or later	For students completing a MS the Dissertation Committee should be formed within the next two semesters.

This table is for guidance purposes only. It defines faculty expectations in the Cognitive Science Department. However, it is not a contract. You need to work closely with your Graduate Advisor to define their expectations for your timetable.

Keep in mind that the PhD Dissertation is a research project. Research cannot be produced on a clockwork schedule. You should expect delays, iterations, additional analyses, additional experiments. The goal of the Dissertation in the Cognitive Science Department is not simply to pass a hurdle, but to demonstrate your ability to produce professional quality research that represents an intellectual contribution to your research community, and which will be presented to your research community via a high quality journal and/or conference presentation.