Cognitive & Information Sciences
Ph.D. AND MS DEGREE REQUIREMENTS

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1. Introduction

1.1 Aims and Scope:

The Cognitive and Information Sciences (CIS) graduate program offers its master's and doctoral students interdisciplinary training in cognitive science with an emphasis on computation, theory, and applications. We tend to view intelligent behaviors as emerging from interactions between brain, body, and environment. Thus, cognition and behavior are often understood in the context of group and social interactions, situated in their cultural and ecological milieu. The word "information" in CIS denotes our broad, interdisciplinary perspective on cognition, which often involves the study of the cognitive, social, and technological systems involved in information flow. Faculty in our program specialize in a variety of areas that intersect with these concerns, including computational modeling, complex systems theory, distributed cognition, psycholinguistics, sensory perception, cognitive engineering, service science, artificial intelligence, reasoning, computer vision, philosophy of mind, cognitive neuroscience, cultural evolution, and applied ethics. With computational, technological, and application-oriented skills in these areas, students who graduate from the M.S. and Ph.D. programs will have career opportunities in academia, private industry, and the public sector.

Graduate study in CIS focuses on acquiring the conceptual and methodological skills necessary to operate as an independent researcher. At UC Merced, this is accomplished through a mentorship model in which students work closely with a supervising Faculty Advisor who has primary responsibility for overseeing that student's training. At the same time, students may broaden their research training through involvement in research programs conducted by other faculty. In addition, there are program requirements that encourage the development of broader foundational knowledge. For example, Ph.D. students must complete a program

of coursework, an Integrative Review Paper, a written dissertation proposal that is then presented in a Candidacy Exam, and a Doctoral Dissertation involving original empirical, computational, and/or philosophical research that contributes to knowledge in the field. These are only the major requirements and are not meant to be exhaustive. It is also expected that graduate students will contribute to and generate additional research and add to the intellectual and organizational life of the department. The M.S. degree involves a more condensed version of the Ph.D. program, with more of a focus on developing skills and expertise and less on the formulation and initiation of a comprehensive research program. The requirements for both the M.S. and Ph.D. programs are provided in full detail below.

The Doctor of Philosophy and Master's of Science degrees are not granted by the University of California merely for the fulfillment of technical requirements. Rather, the recipient of an M.S. or Ph.D. degree is understood to possess thorough knowledge of a broad field of learning, have demonstrated evidence of distinguished accomplishment in that field, and have evidenced critical ability and powers of imaginative synthesis. In the case of the M.S. degree, this is signified by the approval of a thesis or capstone project. The Ph.D. degree also signifies that the recipient has presented a doctoral dissertation containing an original contribution to knowledge in their chosen field of study.

In addition to this manual of Policies and Procedures for Graduate Students in CIS, important information for graduate students is also contained in Graduate Division's Policies and Procedures Handbook, and the UC Merced Catalogue.

1.2 Admissions Requirements:

Applicants must meet the minimum requirements for admission to graduate study at the University of California, Merced, described in the Section II of the Graduate Policies and Procedures Handbook Admission into the Cognitive and Information Sciences Ph.D. or M.S. program further requires that there be a CIS faculty member willing to be the student's advisor at the time of admission. The CIS program does not require the GRE exam. Admission decisions are made on a case-by case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility.

1.2.1 Prerequisites:
There are no other prerequisites for admission into the program.

1.2.2 Deficiencies:

N/A

1.3 General Committees:

1.3.1 Executive Committee:

The Executive Committee (EC) will oversee the running of the CIS graduate program, ensuring that students are making satisfactory progress, and hearing any student grievances. The EC will consist of, at minimum, two faculty Core Members: the Group Chair and a Core Member who serves as Vice Chair. Additional EC members may be added at any time in a nomination and voting procedure consistent with that described for the Chair and Vice Chair, as described in the CIS Graduate Group Bylaws. Before this process takes place, a majority vote will be

conducted among Core Members of the Graduate Group to determine that additional EC membership is needed. In the event that the Chair is unable to perform duties for an extended period of time (such as during a sabbatical), the Vice Chair will act as Interim Chair.

Any appointed membership will last for 3 years, though membership may be extended by majority vote of the full Core Membership of the Group. Chair, Vice Chair, and any additional Core Members who are added to the EC have full voting privileges on the EC. The EC will make appointments to the standing committees of the Group. The term of service in each standing committee will be three years. Extensions beyond the three-year term require a majority vote of the EC for each year of the extension. Approvals of appointments to standing committees require a simple majority of the EC. Any unconstituted standing committee will have its duties conducted by the EC.

1.3.2   Admissions Committee:

The Admissions Committee shall be constituted by at least three CIS Graduate Group core faculty members appointed by the Executive Committee, and is charged with the development of recruiting materials for the Group, reviewing applications for admissions (in consultation with members of the Graduate Group), making recommendations for admissions to the Dean of Graduate Studies, exploring graduate student support mechanisms, and allocating intramural financial assistance. Members of the Executive Committee may also serve on the Admissions Committee. The term of service is two years, and appointments are renewable.

1.3.3 Education Policy Committee:

The Educational Policy Committee (EPC) is responsible for establishing and guiding the educational programs of the Group. The EC Vice Chair will chair the EPC. The EPC is charged with establishing and maintaining documentation on the CIS curriculum, and preparing for assessment and review activities, including the program's five-year review. The EPC, in consultation with CIS Graduate Group Core Members, will coordinate and document changes in programmatic requirements of the Ph.D. or M.S. programs, and present proposed changes to the voting body. This committee will be constituted by at least two Group members (including the EC Vice Chair) appointed by the EC. The term of service will be two years for the regular members, and appointments are renewable.

2. Master's Degree Requirements

Students may enroll in the M.S. program as a standalone degree program or they may acquire the degree *en route* to the Ph.D. degree. The M.S. degree program has the same foundational course requirements as the CIS Ph.D. degree program. The recipient of the M.S. degree is understood to possess knowledge of a broad field of learning that extends well-beyond that attained at the undergraduate level, but is not expected to have made a significant contribution to knowledge in the field. A CIS faculty member must agree to serve as academic advisor for any applicant admitted to the M.S. program. Two other CIS faculty members will be identified to serve as advisory committee members by the student and their advisor, to be finalized by the end of the first semester.

The M.S. requires 24 semester units in approved courses. Students will choose either Degree Plan I (thesis option) or II (capstone option), described in more detail below. The default plan will be the thesis option,

while the capstone option provides alternatives for more industry-oriented or otherwise non-academia-bound students. Program Learning Outcomes (PLOs) and course requirements are the same for both options.

2.1 Program Learning Outcomes (PLOs):

1. *Foundational Knowledge in Cognitive and Information Science*. Students will be able to digest and analyze technical articles in cognitive science, including the methods, results, and implications for theory and applications. This is a focus of COGS 201 & 202, and may also be learned in other courses and the capstone or thesis.

2. *Foundational Skills in Cognitive and Information Science*. Students will be able to do one or more of the following: 1) program basic cognitive science experiments and analyze the results; 2) analyze large-scale datasets such as language, image, or video corpora; 3) program and run computer simulations of cognitive or behavioral processes; or 4) apply computationally sophisticated analytic techniques to datasets relevant to human behavior or neural activity.

3. *Research Project Design*. Students will be able to plan small research projects involving behavioral and/or cognitive phenomena, including the following components: research questions, competing hypotheses, and empirical or computational methods of inquiry.

4. *Scientific and Professional Writing*. Students will be able to write short scientific articles (about 5 journal pages) or similarly brief technical or professional reports.

2.2 Course Requirements - Core and Electives (total 24 units)

The following 4-unit courses are required for the completion of the M.S. degree:

· COGS 201 & 202: Foundations in Cognitive Science. These two courses cover the main theoretical frameworks (201) and methodologies (202) of contemporary cognitive science, with the historical context needed to appreciate progress and directions in the field.

· COGS 210: Statistics for Cognitive Science

· ONE graduate-level course in CIS-related computational science. Options include:

  • COGS 203: Neural Networks in Cognitive Science
  • COGS 204: Complex Adaptive Systems
  • COGS 212: Methods of Data Science
  • COGS 222: Modeling Social Behavior
  • COGS 223: Computational Cognitive Neuroscience

· TWO other graduate-level courses in COGS or other related programs. Special topics are regularly offered as COGS 269 or COGS 285. COGS 250 cannot fill this requirement (for more information on COGS 250, see section 3.2). MS students may receive transfer credit for courses completed elsewhere pending approval of the Graduate Group Chair.

The CIS Graduate Group will ensure that adequate course offerings to complete the M.S. course requirements are offered each academic year. Courses taken toward a graduate degree at another institution cannot be transferred for credit toward an M.S. at UC Merced. However, a course requirement may be waived if a similar course was taken at another institution. The General Petition form should be used for all requests for waivers of course work.

2.2.1 Summary: In total, 24 units are required before the M.S. degree can be awarded. Students enrolled in the M.S. program are typically expected to complete all coursework in one academic year. The CIS faculty will ensure that a full course load that can fulfill the M.S. course requirements is offered each academic year. Ph.D. students acquiring a M.S. *en route* are expected to complete all coursework by the end of their second year. Graduate Division requires that full-time students must enroll for 12 units per semester, including research, academic, and seminar units, in order to qualify for fellowships or other assistantships. For registration purposes, students are considered full-time if they are enrolled in at least 8 units per semester. Per UC regulations, ordinarily students shall not receive credits for more than 12 units of graduate-level (200) courses per semester.

2.2.2 Special Requirements:

N/A

2.3 Advancement to Candidacy: Before advancing to candidacy for the Master's degree, a student must have satisfied all course requirements, must have maintained a minimum GPA of 3.0 in all course work undertaken, and must have had a written plan for a Thesis or Capstone project approved by their committee. Students must be advanced to candidacy prior to degree conferral. Normally, students advance by the end of the second semester. The student must file the appropriate paperwork (Application for Advancement to Candidacy for the Master's Degree and Conflict of Interest Form), which can be accessed through the Graduate Division website.

2.4 Thesis Requirements:
The Thesis option will consist of an original research project. The project may be empirical or computational, and it will include data collection and/or analysis to produce and interpret results. The research plan will be developed by the student in consultation with the advisory committee. For an empirical project, the plan will include the research question and hypotheses, the targeted amount of data to be collected, the means and timeframe by which data will be collected, and the types of analyses to be conducted. Plans for computational projects will be analogous but based on simulations or corpus analyses instead of experiments. The thesis will report on the research project and be formatted as a short journal article submission. At the outset, the advisory committee will identify a target journal and submission type. The advisory committee will evaluate the thesis as if it was submitted for publication, and a passing thesis will be equivalent to a review of "revise and resubmit" or better. The thesis does not need to be submitted for publication to earn the M.S. degree.

Should the Thesis Committee determine that the thesis is unacceptable, a recommendation to disqualify the student may be made to the Vice Provost and Dean of Graduate Education. Detailed

information and instructions on the submission and filing of the thesis is available in the UCM Thesis and Dissertational Guidelines, available on the Graduate Division website. A schedule of dates for filing the thesis in final form are published on the Graduate Division website in the Dates and Deadlines section.

2.5 Capstone Requirements

Students opting for the capstone track will meet with their advisory committee by the beginning of their second semester to formulate a capstone activity. Each student and committee may choose from one of the three options listed below, or they may formulate an individualized capstone comparable in workload and rigor pending approval of the advising committee. For all capstone projects, the advisory committee will evaluate the document against the deliverables specified in their agreement.

· **Literature Review**. The advisory committee will work with the student to formulate one or more research questions, an outline, and reference list. The resulting paper will be about 10-20 double-spaced pages in length, not including references and other supporting material, and is expected to summarize the existing literature related to the specified research question(s).

· **Computational Project**. The advisory committee will work with the student to formulate a coding project, including the targeted platform, functionality, and tests. The project will culminate in the code and a10-20 page (double-spaced) technical report.

· **Industry Internship**. CIS faculty members have connections with industry partners (primarily, though not exclusively, in Silicon Valley), and students may make connections on their own to find summer internships, paid or unpaid. If a student finds an internship opportunity, possibly with the help of faculty connections, they will write a 10-20 page (double-spaced) report summarizing the experience and relating it to the relevant scholarship in cognitive science.

2.6 Comprehensive Examination:

There is no separate examination for the M.S. degree. Qualification for the degree is achieved upon successful completion of the required courses and approval of the thesis or capstone project by the student's committee. Evaluation of the thesis or capstone serves as the final examination for the M.S. and can result in either a pass, fail, or partial pass by unanimous consensus of the advisory committee. The results, as well as the procedures for repeating a failed examination, are described in Section VI. F of Graduate P&P Handbook. The committee must report the result to the Graduate Council via the Vice Provost and Dean of Graduate Education within 30 days, using the Final Report for the Master's Degree Form found on the Graduate Division website.

2.7. Advising Structure and Mentoring

Incoming students must have a Faculty Advisor prior to commencement of their studies. The process of negotiating this working relationship is to take place prior to enrollment in the program. The Faculty Advisor is the faculty member who supervises the student's research and thesis. The Faculty Advisor must be a core member of the Cognitive & Information Sciences Graduate Group. The student's selection of Faculty Advisor must be approved by both the faculty member in question and by the CIS Graduate Group

Chair. The student and the Faculty Advisor will interact intensely and together develop research projects that will lead to a focus to be pursued in the student's thesis or capstone project. The Faculty Advisor, in the role of a mentor, plans strategies that will support the development of required competencies and provides ongoing informal feedback regarding the student's progress. The Faculty Advisor will normally serve as Chair of the student's Faculty Advisory Committee and Master's Thesis Committee.

A graduate student is expected to have a faculty advisor at all times during their graduate studies, and must do so to remain in good standing. Each student is admitted to the program with one or more assigned advisors. In the absence of a faculty advisor, the Graduate Group Chair becomes the student's temporary advisor for a period of no more than 30 days under normal circumstances. It is the responsibility of the student to secure a permanent advisor in a timely manner. If the student does not have a permanent advisor after 30 days, they will receive a notice of unsatisfactory progress. Per Graduate Division guidelines, the student will then have one semester to return to satisfactory program or be disqualified. During this time, the Graduate Group Chair will continue to serve as the student's temporary advisor.

CIS has adopted the Mentoring Guidelines approved by the UC Merced Graduate Council, which can be found at:
https://graduatedivision.ucmerced.edu/faculty-staff/resources/mentoring-resources

Additional mentoring of a student is provided by a Faculty Advisory Committee, which is chaired by the Faculty Advisor. The Faculty Advisory Committee must include at least 3 faculty members, at least 2 of whom must be faculty members in CIS, including the Faculty Advisor. Members of the Faculty Advisory Committee may be replaced by agreement among the student, Graduate Group Chair, and the committee member being added, and approval by the Vice Provost and Dean of Graduate Education. When possible, the committee member being replaced should be involved in the discussion. For terminal M.S. students, this committee should be comprised by the end of the first semester in the program.

2.8 Normative Time to Degree: For terminal M.S. students who are engaged in full-time study and making adequate progress, it is expected that they would advance to candidacy and complete the degree in 1 calendar year (2 semesters plus a summer).

2.9 Typical Timeline and Sequence of Events
[The below table is only provided as an example: timeline may vary between individuals]

Year One	*Fall*	*Spring*
	COGS 201: Foundations I	*COGS 202: Foundations II*
	COGS 204: Complex Adaptive Systems	*COGS 210: Statistics for Cognitive Science*
	COGS 230: Cognitive Neuroscience	*COGS 278: Cognitive Science of Emotions*

Summer	*Complete Thesis or Capstone Project*	

2.10 **Standing**: Students must be in good standing to remain in the program. Good standing includes having an advisor, progressing in normative time to degree, and maintaining a GPA of at least 3.0. If a student is deemed not in good standing, the student will receive a letter of warning about potential academic disqualification, including the necessary steps to return to good standing, which must be taken to the satisfaction of the Graduate Group Chair within one semester.

2.11 **Sources of Funding:** Terminal M.S. students are not expected to be funded by either teaching assistantships or research grants. That said, graduate students are encouraged to seek out grant funding and employment opportunities on campus to support their research.

2.12 **Change of Degree Level (Master's to Ph.D.):** M.S. students wishing to enter the CIS Ph.D. program can apply internally to transfer to the Ph.D. program at times approved by the Admissions Committee. All the requirements for admission to the Ph.D. program will apply, and admission to the M.S. program does not guarantee admission to the Ph.D. program.

3. Doctoral Degree Requirements

The Ph.D. reflects both deep expertise in the field of cognitive and information sciences (broadly defined) and having made a significant original contribution to knowledge and/or understanding of that field. A CIS core faculty member must agree to serve as academic advisor for the applicant prior to the commencement of studies (see section 3.8). Two other CIS faculty members will be identified as advisory committee members, to be finalized by agreement between the student and the faculty members by the end of the second semester. The Ph.D. requires the same 24 semester units in approved courses as the M.S. degree (see below), with the additional requirement that students must also enroll in COGS 250 (Minds, Technology, & Society) every semester they are enrolled and in residence. Each student produces an Integrative Review (IR) paper that may serve as an M.S. thesis, and a dissertation that must be approved by their committee to obtain the Ph.D.

3.1 Program Learning Outcomes (PLOs):

1. *Foundational Knowledge in Cognitive and Information Science*. Students will be able to digest and analyze technical articles in cognitive science, including the methods, results, and implications for theory and applications. This is a focus of COGS 201 & 202, and may also be learned in other courses and as part of the work toward a dissertation.

2. *Foundational Skills in Cognitive and Information Science*. Students will be able to do one or more of the following: 1) program basic cognitive science experiments and analyze the results; 2) analyze large-scale datasets such as language, image, or video corpora; 3) program

and run computer simulations of cognitive or behavioral processes; or 4) apply computationally sophisticated analytic techniques to datasets relevant to human behavior or neural activity.

3.   *Research Project Design*. Students will be able to plan research projects involving behavioral and/or cognitive phenomena, including the following components: research questions, competing hypotheses, and empirical or computational methods of inquiry.

4.   *Scientific and Professional Writing*. Students will be able to write short scientific articles (about 5 journal pages) or similarly brief technical or professional reports.

3.2 Course Requirements - Core and Electives (total 24 units, plus COGS 250)
The following courses are required for the completion of the Ph.D. degree:
·   COGS 201 & 202: Foundations in Cognitive Science. These two courses cover the main theoretical frameworks (201) and methodologies (202) of contemporary cognitive science, with the historical context needed to appreciate progress and directions in the field.
·   COGS 210: Statistics for Cognitive Science
·   ONE graduate-level course in CIS-related computational science. Options include:
  •   COGS 203: Neural Networks in Cognitive Science
  •   COGS 204: Complex Adaptive Systems
  •   COGS 212: Methods of Data Science
  •   COGS 222: Modeling Social Behavior
  •   COGS 223: Computational Cognitive Neuroscience
·   TWO other graduate-level courses in COGS or other related programs. Special topics are regularly offered as COGS 269 or COGS 285. COGS 250 cannot fill this requirement.
·   COGS 250: Minds, Technology, and Society. This course is a seminar typically consisting of weekly lectures by visiting speakers, with assignments dictated by the instructor of record. Ph.D. students must enroll in this course *every semester* they are enrolled in the program and in residence at UC Merced. M.S. students are encouraged but not required to attend lectures, and may not enroll. There is no requirement to make up any additional semesters of COGS 250 if an M.S. student is later admitted to the PhD program.

Students must have maintained a minimum GPA of 3.0 in all course work undertaken, and must receive a grade no lower than a "B" in any of their required courses. Courses taken toward a graduate degree at another institution cannot be transferred for credit toward a Ph.D. at UC Merced. However, a course requirement may be waived if a similar course was taken at another institution, or the student otherwise demonstrates proficiency in the course material. Note that credits required for the degree cannot be waived, so students must replace a waived course with other credits. The General Petition form should be used for all requests for waivers of course work. The Graduate Division requires that full-time students must enroll for 12 units per semester, including research, academic, and seminar units, in order to qualify for fellowships or other assistantships. For registration purposes, students are considered full-time if they are enrolled in at least 8 units per semester. Per UC regulations, ordinarily students shall not receive credits for more than 12 units of graduate-level (200) courses per semester, but additional units may be added by exception.

3.3 Special Requirements:

3.3.1 *Residency Requirement***:** Students must complete at least six semesters of full-time academic residence at UC Merced. In addition, before advancing to candidacy, Ph.D. students must be registered in University courses as a full-time student for at least four semesters.

3.3.2 *Teaching Requirement***:** CIS requires all graduate students pursuing the Ph.D. to acquire teaching experience at the post-secondary level under faculty supervision, for at least two semesters at UC Merced. This requirement is typically satisfied by appointment as a Teaching Assistant or Teaching Fellow in undergraduate courses. For more information, consult the Academic Appointment and Graduate Student Employment section in the Graduate Policies and Procedures Handbook.

3.3.3 *Presentation Requirement***:** Students must deliver a full-length (usually 45-60 minutes) technical seminar (an oral presentation on the student's original research) at least once while in residence at UCM. This can be fulfilled by offering a presentation at the weekly CIS Brownbag meeting; however, the seminar may be given in any scholarly public venue that is approved by the student's advisory committee (prior to the time the talk is given). At least one CIS faculty member must be present at the seminar.

3.4 First- and Second-Year Research Presentations and Reports:

3.4.1. Presentations. Each student must give a talk on a research project that they are working on at the end of their first year, and another at the end of their second year. Unless otherwise arranged, all first- and second-year talks will occur on the same day near the end of the semester, such as the 2nd Friday of May, in a mini-conference format attended by CIS Graduate Group members. Talks will typically be 15-20 minutes in length. Talks should focus on the research that the student has been conducting in the CIS program. Discussion of work conducted elsewhere should be limited to how it directly relates to the work being conducted at UC Merced. Students should consult with their advisors about the content of the presentations.

3.4.2. Written Reports. First- and second-year students must also write a research report each year. Each report is to be formatted in a manner consistent with submission for academic publication. The papers are to be double-spaced, with margins no larger than 1.5 inches, in a font no smaller than 12 point, and no less than 10 pages in length not including references. Reports will be due to the members of the student's advising committee and the Graduate Group chair shortly after the day of presentations (e.g., last Friday of May, to allow time for revision based on feedback). First- and second-year research reports are expected to serve as the bases for conference proceedings submissions or journal articles. Advisory committees will evaluate reports and presentations in terms of progress towards professional academic work in one or more areas of cognitive science. First-year reports will be given a grade of Pass, Conditional Pass, or Fail, whereas second-year reports may also be given Revise and Resubmit as a grade, allowing for rounds of revision. Faculty must provide the first round of feedback by one month from submission of their respective reports, and the final grade by three months from

submission. The final evaluation of the committee on these papers will be recorded and taken into account when the student is considered for advancement to candidacy.

3.5 Integrative Review Paper

Graduates of the Ph.D. program in CIS are expected to possess a broad understanding of the full range of theories and methods employed in this interdisciplinary field. In order to assess the breadth of student knowledge, and in order to encourage an integrated view of the varied contributions that different disciplines make to cognitive and information sciences, each student must compose an integrative review (IR) paper. This paper will review and synthesize literature that is relevant or related to the student's topic(s) of study, with the view that each research topic studied in CIS can be tackled from multiple perspectives and levels of organization, using different methods and approaches. The paper should integrate, at a deep level, research, theories, and methods from each of six approaches to CIS. Five approaches are set in advance:

- · Behavioral science
- · Computational modeling
- · Language and linguistics
- · Neuroscience
- · Philosophy

In addition, the IR paper should also integrate research, theories, and methods from a *sixth approach* to be decided upon by the student and their Faculty Advisory Committee, reflecting the need for diverse approaches in an interdisciplinary program. Possibilities for this elective approach include (but are not limited to) Cognitive Engineering, Anthropology, Evolutionary Biology, or Education. The IR paper is to be formatted in a manner consistent with submission for academic publication. The paper is to be double-spaced, with margins no larger than 1.5 inches, in a font no smaller than 12 point, and no less than 30 pages in length, not counting references. The paper should reference at least 60 previous publications or other informational sources. The IR paper is to reflect the individual understanding and solitary effort of its student author. While members of the student's Faculty Advisory Committee may be consulted for guidance, and other researchers may act as sources of information, the content of each submitted paper is to be composed by the student, alone. Students are expected to strive to produce documents of the highest quality, both in terms of scholarship and in terms of presentation. It is anticipated that some or all of the text from the IR paper will be revised and expanded by the student in order to produce a publishable manuscript, allowing this requirement to act both as a program milestone and a means for strengthening the student's academic credentials. Students should strive to turn in their IR paper to their advising committee during their fifth semester, and *must* submit it by the end of their sixth semester. Advising committees may also request that the student give an oral presentation to accompany the IR paper.

The IR paper will be assessed by the student's advising committee and be given a grade of Full Pass, M.S. Pass, Conditional Pass, or Fail. A grade of Fail will result in Academic Disqualification as described in the Graduate Policies and Procedures Handbook, and the student will be ineligible to continue to work toward any degree in the program. A grade of Fail should be given only in cases when the student's committee does not view a successful and timely revision as likely. For a

conditional pass, the committee will indicate additional revisions to the IR paper that, if completed successfully according to a schedule dictated by the committee, will result in a Full Pass. A grade of M.S. Pass indicates that the student is viewed as unqualified to continue in the Ph.D. program, but that the IR paper can satisfactorily serve as a capstone or thesis project, enabling the student to leave with the M.S. degree. A Full Pass indicates that the student will continue in the program, and will also denote that the IR paper can serve as the capstone or thesis requirement for the M.S., should the student wish to file for that degree *en route* to the Ph.D.

3.5.1. Receiving an *en route* M.S. degree. Successful completion of the core 24 credits of required coursework described above, as well as a passing grade on the IR paper, shall qualify a student to receive an M.S. degree *en route* to the Ph.D. To receive this degree, the student must file appropriate paperwork with the Graduate Division.

3.6 Advancement to Candidacy

All students in the CIS Ph.D. program are required to pass a Qualifying Examination prior to advancement to candidacy for the Ph.D. degree. Before taking the Qualifying Examination the student must have completed all required formal coursework and successfully received a grade of "Full Pass" on the Integrative Review Paper. Students must also formally file with the Graduate Division to schedule their Qualifying Examination. It is expected that students will complete the Qualifying Examination prior to the completion of their sixth semester in academic residence (excluding summer semesters) at UCM, and it *must* be completed prior to the completion of their eighth semester. The Qualifying Examination has three basic purposes. First, it is intended as a test of the breadth of knowledge of the student, providing a forum for interactive challenges to the student's mastery of core cognitive science concepts and methods. Second, it determines if the student possesses the knowledge and skills needed to successfully complete a dissertation research project in their chosen area of interest. Third, and lastly, it provides a means for providing constructive criticism of the student's plan for his or her dissertation research. In pursuit of these three goals, the Qualifying Examination includes both a written component (i.e. the dissertation proposal) and an oral component.

To evaluate the Qualifying Examination, an Examination Committee must be established for the student. Like the Faculty Advisory Committee, this committee must consist of the Primary Research Advisor and two other program faculty members, though additional faculty may be invited to join the Examination Committee beyond these minimal requirements. While it is not required, it is generally desirable for the Examination Committee to be identical in membership to the later constituted Dissertation Committee, described below, and members should be selected with this goal in mind. The members of the Examination Committee must be approved by the student, the Primary Research Advisor, the nominated committee members, and, additionally, by the Vice Provost and Dean of Graduate Education. Approval will involve signatures on the Graduate Division paperwork to schedule the examination. The primary charge of the Examination Committee is to evaluate student performance on the Qualifying Examination. This faculty group also acts as the student's Faculty Advisory Committee from the time it is constituted until a Dissertation Committee is established.

3.6.1. Dissertation Proposal. In order to advance to candidacy, students must submit a written Dissertation Proposal to their Examination Committee, and defend the proposal in a privately held oral exam in front of all members of the committee. The proposal is expected to make a convincing case that the proposed research is likely to make an original contribution to human knowledge, is of sufficient interest to be worthy of pursuit, and is feasible given the student's skills, time constraints, and available resources. In order to defend the novelty of the research, as well as explain its significance, this document should include a substantial review of the literatures that are directly relevant to the proposed dissertation project. In order to justify the feasibility of the proposal, the document should include an overview of progress to date, as well as a detailed description of the research yet to be completed, along with an estimated schedule for the component tasks. Depending on the scope of the proposed dissertation project, the proposal document need not be long (e.g., typically about 30 double-spaced pages), but it should make a clear case for the program of work. The document should be double-spaced, with margins no larger than 1.5 inches, and in a font no smaller than 12 point. The topic of the dissertation research proposal is to be determined by the student in negotiation with the student's Primary Research Advisor. The document must be approved by the Primary Research Advisor before it is delivered to the other members of the Examination Committee. Informal feedback on this document may be provided by Examination Committee members prior to the oral component of the Candidacy Examination, but the primary forum for feedback is to be the oral defense of the proposal. Thus, the negotiated date of the oral component of the Oral Candidacy Examination must allow at least four weeks for the Examination Committee to evaluate the dissertation proposal document, in accordance with Graduate Division policy.

3.6.2. Oral Candidacy Exam. In order to advance to candidacy, each student in the CIS Ph.D. program must pass an oral Candidacy Examination, including an oral defense of the written dissertation research proposal. The oral component of the Candidacy Examination is to be scheduled by consensus of the student and the members of the student's Examination Committee. The examination meeting must not take place earlier than four weeks after the dissertation research proposal has been delivered to the members of the Examination Committee. This meeting *should* be held before the beginning of the student's seventh semester in residency at UCM (excluding summer terms), and *must* be held before the beginning of the student's ninth semester. All members of the Examination Committee must either be physically present at the Candidacy Examination meeting, or must be able to robustly interact with physically present participants through the use of sufficiently high bandwidth telecommunication technologies. (The central participants, including both the members of the Examination Committee and the student being examined, must be unanimous in their acceptance of any telecommunication surrogate for physical presence.) Unless the Examination Committee unanimously decides on an alternate format, the format of the oral Candidacy Examination is to include a presentation by the student. The meeting is normally expected to be closed to outside observers, but the meeting may be made open to the UCM CIS community, to the broader University community, or to members of the public upon unanimous consent of the members of the Examination Committee. At minimum, students should expect to be questioned by members of the Dissertation Committee on the following topics:

- · general knowledge of CIS concepts and methods
- · contents of coursework completed by the student

- material related to the Integrative Review Paper prepared by the student
- material related to the student's written dissertation research proposal

The oral Candidacy Examination is to last no more than three hours, including deliberations. Once all members of the Examination Committee are satisfied with the questions that have been presented, the Examination Committee must meet in private in order to deliberate and determine the results of the examination. The results of these deliberations should be communicated to the student being examined as soon as possible, usually immediately upon their completion. The conclusions of the Examination Committee should be communicated to the Dean of Graduate Studies, using the forms provided by the Graduate Division.

3.6.3. Evaluation and Advancement to Candidacy. There are three possible outcomes for the Candidacy Examination: Pass, Conditional Pass, and Fail. An outcome of "Pass" is unconditional. The student cannot be required to satisfy any other conditions before obtaining the benefits of passing this examination. A "Conditional Pass" is treated as a "Pass" outcome as soon as the student satisfies certain specific conditions detailed by the Examination Committee at the time of the assignment of the "Conditional Pass" outcome. Acceptable conditions include the successful completion of prescribed courses and the rewriting of the dissertation research proposal. A student who receives a "Fail" outcome may repeat the Candidacy Examination after a preparation time of no less than three months. Typically, a new dissertation research proposal is prepared for the repeated examination, but the original document may be used with the unanimous consent of the members of the Examination Committee. The repeated examination must be officiated by the same Examination Committee, though members of this committee may be replaced, with the approval of the Primary Research Advisor, if cause, such as extended absence from campus, is demonstrated and documented. Failure to pass the examination upon a second attempt disqualifies the student from further study toward the doctoral degree. The Dissertation Committee must reach a unanimous decision with regard to the outcome of this examination.

If the exam is passed, the Examination Committee immediately takes actions to advance the student to candidacy, as mentioned above. If the exam is initially failed, the result (as always) is immediately communicated to the student, and planning should begin for a repeated examination. If the exam is then failed again, the result is immediately communicated to the student, as well as to the Vice Provost and Dean of Graduate Education. If the exam is passed conditionally, a document detailing the conditions to be met by the student should be provided to the student within one week of the examination. Once these conditions are met, the Examination Committee confers to determine if the conditions have been satisfied and if the student should be advanced to candidacy.

3.7 Ph.D. Dissertation and Thesis Defense

Students must successfully complete a written doctoral dissertation containing an original contribution to scientific knowledge in some domain within cognitive and information sciences. The dissertation should contain material of a quality that is worthy of scholarly publication, and must be formatted according to campus guidelines for dissertation manuscripts. The student must also give an oral presentation of the dissertation that is open to the campus community, and may be open to the general public with consent of both the student and their advisory committee. The presentation is to be

followed by a private session of questions and discussion with the advisory committee. The quality of the dissertation and the defense of its thesis are evaluated by the Dissertation Committee in order to determine if the student has successfully completed this final requirement for the Ph.D. degree in CIS.

3.7.1. The Dissertation Document. The Ph.D. dissertation must be a creative and independent work that can stand the test of peer review. The research described in this document must be original and defensible. The expectation is that the dissertation will serve as the basis for at least one publication in a peer-reviewed journal, though it is not uncommon that between two and four publications will result from the dissertation. The reported work and the written composition must be the student's own, though the student is encouraged to discuss both the substance and the preparation of the dissertation with the members of her or his Dissertation Committee well in advance of its final defense.

While the dissertation document is expected to provide a complete and comprehensive characterization of the student's Ph.D. research project, there are no universal requirements concerning the format of this document. Each student's Primary Research Advisor is responsible for providing structuring and formatting guidelines for the dissertation document, in consultation with the student's Dissertation Committee. Once the dissertation document is complete in the opinion of the student and the student's Primary Research Advisor, the student must provide a copy of the dissertation to each member of her or his Dissertation Committee. Each committee member must be given at least four weeks to read the dissertation and provide informal comments on it before the date scheduled for the thesis defense. If one or more committee members find that there are significant errors or shortcomings in the dissertation, or that the scope or nature of the work is not adequate, the student must address these shortcomings before the defense. Thus, some students may wish to submit their dissertation to their committee and receive feedback *before* scheduling a defense.

3.7.2. Thesis Defense. The Ph.D. thesis defense consists of an open seminar on the dissertation work followed by a closed examination conducted by the Dissertation Committee. During the examination, the student is expected to explain the significance of the dissertation research, justify the methods employed, and defend the conclusions reached.

The thesis defense cannot commence until all members of the Dissertation Committee have read the dissertation and agreed that it is ready to be defended. Once such an agreement has been reached, the student is expected to work with the members of the Dissertation Committee in order to schedule a date and time for the defense. Members of the dissertation committee should make efforts to ensure the defense is scheduled in a timely fashion. All members of the Dissertation Committee must attend the thesis defense, either through physical presence or through the use of a high-bandwidth telecommunications technology that is unanimously accepted by the student and all members of the Dissertation Committee. The thesis defense cannot extend beyond three hours, but a block of time of that size should be reserved for this event in every case. Once the date of the thesis defense is determined, this information must be reported to the Vice Provost and Dean of Graduate Education, and one copy of the dissertation must be filed with the Graduate Division no later than two weeks before the scheduled date of the thesis defense.

Immediately following the closed examination of the student by the Dissertation Committee, the members of the Dissertation Committee shall meet in private in order to discuss the student's performance. At the conclusion of these deliberations, the committee shall vote on the question of whether both the written dissertation and the student's performance during the defense are of sufficient quality to warrant the awarding of a Ph.D. degree from the University of California. A unanimous vote of "pass" is required to pass. However, members of the committee may also vote to make conferral of the degree contingent on corrections and/or revisions to the dissertation. In this case, the committee will select one member, normally the Primary Research Advisor, to be responsible for approving the final version of the dissertation that is submitted to the Graduate Division. All members of the Dissertation Committee must sign the final dissertation.

Upon completion of the final examination and approval of the dissertation, the Doctoral Committee recommends, by submission of the Report on Final Examination of the Ph.D. Degree Form, the conferral of the Ph.D. subject to final submission of the approved dissertation for deposit in the University Archives. The Committee recommendation must be unanimous (even if the initial vote was not). Detailed information and instructions on the submission and filing of the dissertation is available in the UCM Thesis and Dissertation Manual. A schedule of dates for filing the thesis in final form are published on the Graduate Division website in the Dates and Deadlines section.

3.8. Advising Structure and Mentoring:

3.8.1 Advising Structure: Incoming students must have a Primary Research Advisor prior to commencement of their studies. The process of negotiating this working relationship is to take place prior to enrollment in the program. In some cases, two faculty may share joint duties as the student's Primary Research Advisors, but one faculty member must serve as the primary advisor for purposes of signature authority and responsibility. Primary Research Advisors must be core faculty members of CIS. The appointment of a faculty member as a student's Primary Research Advisor must be approved by the student, by the faculty member in question, and by the program's Admissions Committee. In the unusual situation in which a student begins studies without a Primary Research Advisor, the Admissions Committee will appoint a faculty member to play this role in an interim fashion, though faculty members may decline such appointments. The Admissions Committee communicates the establishment of advisor-advisee relationships to the program's Graduate Group Chair.

Either the student or the Primary Research Advisor may unilaterally terminate the advisor-student relationship at any time by formally communicating such an intention to the Graduate Group Chair. Such a separation is to be avoided, however, as any student without a Primary Research Advisor cannot meet any of the formal program requirements (other than the completion of course work). Students may switch to a new Primary Research Advisor, however, with the approval of the student, the current advisor, the new faculty advisor, the Graduate Group Chair, and the Graduate Dean. The Graduate Division's Change of Advisor form should be used. The Graduate Group Chair may, at their discretion, serve as interim advisor while a new advisor is found.

A graduate student is expected to have a faculty advisor at all times during their graduate studies, and must do so to remain in good standing. Each student is admitted to the program with one or more

assigned advisors. In the absence of a faculty advisor, the Graduate Group Chair becomes the student's temporary advisor. It is the responsibility of the student to secure a permanent advisor in a timely manner. If the student does not have a permanent advisor after 30 days, they will receive a notice of unsatisfactory progress. Per Graduate Division guidelines, the student will then have one semester to return to satisfactory program or be disqualified. During this time, the Graduate Group Chair will continue to serve as the student's temporary advisor.

CIS has adopted the Mentoring Guidelines approved by the UC Merced Graduate Council, which can be found at:
https://graduatedivision.ucmerced.edu/faculty-staff/resources/mentoring-resources

3.8.2. Key Advising Roles

*Primary Research Advisor***.** The Primary Research Advisor (aka Faculty Advisor) is the faculty member who supervises the student's research and thesis. The Primary Research Advisor must be a core member of the Cognitive & Information Sciences Graduate Group. The student's selection must be approved by the proposed Faculty Advisor and by the CIS Graduate Group Chair. The student and the Faculty Advisor will interact intensely and together develop research projects that will lead to a focus to be pursued in the student's dissertation. The Primary Research Advisor, in the role of a mentor, plans strategies that will support the development of required competencies and provides ongoing informal feedback regarding the student's progress. The Primary Research Advisor will normally serve as Chair of the student's Faculty Advisory Committee and Dissertation Committee.

Faculty Advisory Committee. Additional mentoring of a student is provided by a Faculty Advisory Committee, which is chaired by the Primary Research Advisor. This committee will also formally evaluate first- and second-year projects and IR papers. The Faculty Advisory Committee must include at least 3 faculty members, at least 2 of whom must be faculty members in CIS, including the Faculty Advisor. All committee members must be voting members of the University of California, Academic Senate. Nominations of non-faculty members (i.e. Professional Researchers or faculty members from other universities) will be considered on an exception-only basis with the approval of the Vice Provost and Dean of Graduate Education. For further details on the appointment process, see the Graduate Policies and Procedures Handbook on Doctoral Candidacy Committee. All committee members must agree in writing (e.g., via email) to serve on the student's advising committee. The Graduate Group Chair should be informed of all committee makeups. Members of the Faculty Advisory Committee may be replaced by agreement among the student, Graduate Group Chair, and the committee member being added. The committee member being replaced should also be involved in the discussion, with exceptions permitted by the Graduate Group Chair under extenuating circumstances. For Ph.D. students, the committee must be established by the end of the second semester in the first year.

Candidacy Committee: The Candidacy Committee is charged with determining the fitness of the student to proceed with the doctoral dissertation through a formal Qualifying Examination. The Candidacy Committee is usually identical to the Faculty Advisory Committee, but it need not be. The Candidacy Committee is chaired by the student's Faculty Advisor. All additional members must meet requirements to serve on the student's Faculty Advisory Committee.

Dissertation Committee: The Dissertation Committee shall supervise the preparation and completion of the dissertation and the final examination. The Dissertation Committee is usually identical to the Faculty Advisory Committee, but need not be. The Dissertation Committee is chaired by the student's Faculty Advisor. All additional members must meet requirements to serve on the student's Faculty Advisory Committee.

3.8.3. Evaluation of Student Progress

In addition to the numerous milestones and opportunities for feedback detailed above (e.g., first- and second-year reports, IR paper, candidacy exam), general student progress is regularly assessed by means of an Annual Progress Report, submitted by the student, and using the process provided by the Graduate Division. The progress report is a written narrative that summarizes all of the student's activities, accomplishments, and evaluations (e.g. grades, journal reviews, grant reviews, etc.) for the immediately preceding year. Each student submits the progress report to his or her Faculty Advisory Committee early in the Fall Semester of each year (with the exact date specified by the Graduate Program Chair), covering the prior 12-month period from July 1 to June 30. The student's Faculty Advisory Committee, in consultation with all the core faculty of CIS, reviews the report and summarizes their feedback to the student in a written Annual Review Memo. This memo is provided by the Graduate Program Chair to the student and the advising committee. The student's Faculty Advisory Committee may also meet with the student to discuss the Progress Report, at the committee's discretion. Annual Review Memos should be disseminated within six weeks after Progress Reports are due.

In general, satisfactory progress is defined relative to meeting the requirements outlined in the normative time frame in Section 3.9. The Annual Review Memo should clearly communicate whether student progress is or is not satisfactory relative to these requirements and normative time frame expectations. If a student does not demonstrate satisfactory progress, the memo should clearly state the actions that the student must take to achieve satisfactory progress. The following year's Annual Progress Report and Annual Review Memo should, then, address whether the prescribed actions were or were not taken, and whether they resulted in satisfactory progress.

The program requirements detailed in this document apply to all students pursuing a Ph.D. in CIS, but some exceptional circumstances may warrant an adjustment to these requirements for specific students. Any modifications to these requirements for individual students may be requested by petition, with such petitions requiring approval by the student's Faculty Advisory Committee (or, if constituted, the student's Examination Committee or Dissertation Committee), as well as the program's Graduate Group Chair.

3.8.4. Grievance Procedures

It is hoped that a student's time in the Ph.D. program is reasonably free from conflict and that they do not have cause for grievance. Nevertheless, grievances may occur. We strive to foster an environment of inclusion, safety, and free expression in which students and faculty feel comfortable to air grievances. The CIS Climate Committee consists of faculty and graduate students dedicated to promoting just such an environment. More information on the Climate Committee is available on the CIS website. In

general, grievances should be initially addressed to the most immediate authority who is not directly involved in the grievance and whom the student does not believe is unfairly biased. If possible, students should first seek advice from their advisors and other faculty mentors. Next, students can approach the Graduate Group Chair or Department Chair. Students can also seek counsel from the Graduate Academic Counselor. If help at any of these levels is insufficient, students can seek counsel from the School Dean or the Dean of the Graduate Division, which have designated guidelines on student grievances. Additional guidance for managing professional relationships and conflicts between graduate students and faculty can be found on the [Graduate Division Website](#). Resources for dealing with harassment or discrimination can be found at the Office for the Prevention of Harassment and Discrimination website.

3.9 Normative Time to Degree: Students completing this Ph.D. program will be equipped for careers in research, teaching, and industry. Normative Time to Advancement to Candidacy in Cognitive and Information Sciences is six semesters for students entering the program with postgraduate experience or the equivalent in a relevant field (such as a Master's degree). Students who pursue the Ph.D. directly after the bachelor's degree may require an additional year of study. Normative Time in Candidacy, which are the remaining semesters recommended for completion of the dissertation, is two semesters.

3.10 Typical Timeline and Sequence of Events
[The below table is only provided as an example: timeline may vary between individuals]

Year One	*Fall*	*Spring*
	COGS 201: Foundations I	*COGS 202: Foundations II*
	COGS 204: Complex Adaptive Systems	*COGS 210: Statistics for Cognitive Science*
	COGS 250: MTS	*COGS 250: MTS*
		First Year Presentation & Report
Year Two	*Fall*	*Spring*
	COGS 230: Cognitive Neuroscience	*COGS 269: Cultural Evolution*
	COGS 250: MTS	*COGS 250: MTS*
	COGS 295: Directed Study	*COGS 295: Directed Study*

	IR Paper Prep	*IR Paper Prep*
		Second Year Presentation & Report
Year Three	***Fall***	***Spring*** *(advancement to PhD candidacy)*
	COGS 250: MTS	*COGS 250: MTS*
	COGS 295: Directed Study	*COGS 295: Directed Study*
	IR Paper Delivery	*Dissertation Proposal Delivery*
	Dissertation Proposal Prep	*Oral Qualifying Exam*
Years Four-Five	*COGS 250: MTS* *Dissertation*	

3.11   Standing: Students must be in good standing to remain in the program. Good standing includes having an advisor and progressing in normative time to degree, and maintaining a GPA of at least 3.0. If a student is deemed not in good standing, the student will receive a letter of warning about potential academic disqualification, including the necessary steps to return to good standing, which must be taken to the satisfaction of the Graduate Group Chair within one semester.

3.12 Sources of Funding:

Ph.D. students who receive a funding offer with their admissions offer will have their in-state tuition, fees, and salary paid according to the terms of the funding offer. Funding will come through a combination of Teaching Assistantships, Graduate Research Assistantships, and/or Fellowships. Rules for charging, covering, or waiving non-resident supplemental tuition can be found in the Graduate Policies and Procedures Handbook.

3.13. Leaving the Program Prior to Completion of the PhD:

A student admitted for the Ph.D. degree, which, in the judgment of the Executive Committee should not continue past the master's degree, must be notified in writing by the CIS Graduate Group Chair. A copy of the letter must be sent to the Vice Provost and Dean of Graduate Education. In some cases, a doctoral student may choose to leave the program with a master's degree only. Students wishing to obtain an M.S. degree must have completed all course requirements and have had their IR paper approved by their advising committee. In some

cases, other work may substitute as a capstone or thesis project, pending approval of the student's Faculty Advisor and the Graduate Group Chair. It is the responsibility of the Graduate Group unit to notify the Graduate Division via the Change of Degree form so that the student's record may be updated to reflect the student's degree status. This notice must include the student's written permission to have his/her degree objective changed officially from doctorate to master's.

4. General Information

4.1. PELP, In Absentia and Filing Fee status.

Information about PELP (Planned Educational Leave Program), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Policies and Procedures Handbook.