August 4, 2022

Dipak Ghosal
Chair, Computer Science Graduate Group

RE: Computer Science Graduate Group Degree Requirements

Enclosed is a copy of the Computer Science Graduate Group degree requirements as approved by Graduate Council on August 3, 2022 via electronic ballot. These degree requirements are now the revised, official document for the Computer Science Graduate Group and will be posted to the Office of Graduate Studies program webpage:

https://grad.ucdavis.edu/programs/gcsi

Thank you for your efforts on behalf of graduate education.

Sincerely,

Dean Tantillo
Chair, Graduate Council Committee

c: Alyssa Bates, Coordinator, Computer Science Graduate Group
Jessica Stoller, Coordinator, Computer Science Graduate Group
Jasmine Bonite, Director of Policy and Programs, Graduate Studies
Will Angel, Project Policy Analyst, Graduate Studies
Duncan Temple Lang, Associate Dean for Graduate Programs, Graduate Studies
Felicia Murdoch, Policy Analyst, Davis Division of the Academic Senate

The Graduate Group in Computer Science
MS AND PhD DEGREE REQUIREMENTS
Previously Approved by Graduate Council: January 30, 1998;
May 1, 2001; May 18, 2012; May 28, 2021
Graduate Council Approval: August 3, 2022

Master in Science (MS) Degree Requirements

1) **Admissions requirements**: Consideration for program admission requires a bachelor's degree, three letters of recommendation, a completed application form including Statement of Purpose, Personal History and Diversity Statement, official transcripts, TOEFL or IELTS score (if applicable) and Graduate Studies online application with fee by the stated admission deadline. GRE scores are not required.

   a) Proficiency Requirements: In addition to the admission requirements stated above, applicants are expected to demonstrate proficiency at the undergraduate level in five fundamental areas of computer science and in mathematics. These are referred to as the *Undergraduate Proficiency Requirements*. A student must satisfy the undergraduate proficiency requirements by demonstrating proficiency at the undergraduate level in the following areas equivalent to the following UC Davis courses listed below:

Area	**UC Davis Course**
Computer Architecture	ECS154A (Computer Architecture)
Operating Systems	ECS150 (Operating Systems)
Programming Languages	ECS140A (Programming Languages)
Theoretical Foundations	ECS120 (Theory of Computations) or ECS122A (Algorithm Design and Analysis)
Mathematical Foundations	ECS132 (Probability & Statistical Modeling for Computer Science) or MAT135A (Probability) or STA131A (Probability Theory) and one additional mathematics course at the upper division level

Courses taken outside the university are petitioned and reviewed to establish equivalency.

   b) Deficiencies: It is expected that the student will complete the Undergraduate Proficiency Requirements by the end of the first academic year of residence. This deadline may be extended only by approval of the Graduate Advisors Committee.

2) **MS Plan I and Plan II**
   The Graduate Group in Computer Science (GGCS) offers two plans for the MS Degree: Plan I requires a thesis, and Plan II requires either a project or a comprehensive final examination. Students, in consultation with a Graduate Advisor, should decide which plan best suits their individual goals. Students decide on the Plan at the end of 3rd quarter. The comprehensive exam is typically taken during the final quarter. Students can switch MS plan before advancing to candidacy which typically occurs the quarter before they graduate.

Plan I gives the student an opportunity to perform in-depth research and to write a thesis. Plan II ensures a capstone experience either by testing the student on selected core/applied CS subject areas or by allowing the student to obtain a hands-on project experience. The project deliverable which can be a written report or a presentation, is determined by the project advisor. Both plans require 36 units of upper division and graduate course work. At most 4 units of UC Davis upper-division undergraduate course work, completed to satisfy the Undergraduate Proficiency Requirements, may be counted toward the 36 units requirement. Any course taken outside UC Davis and accepted for Undergraduate Proficiency Requirements cannot be counted towards toward the 36 units requirement. The following table summarizes specific requirements for the Thesis option (Plan I), Project option (Plan II), and Exam option (Plan II).

Option	**Format and requirements**	**Number of graduate courses required**	**Number of ECS 299 units allowed**	**Committee**
Thesis (Plan I)	A written thesis	6	12	Thesis advisor plus 2 faculty members
Project (Plan II)	Project deliverable	7	8	Project advisor plus 2 faculty members
Exam (Plan II)	Oral or written exams	9	0	Three faculty members

Two important notes regarding the above table:

1. Note that while the allowed ECS 299 units may be counted toward the 36 units requirement, ECS 290, 293A, 298, and 299 cannot be counted toward the required graduate courses. A grade of B or better must be obtained in all coursework used to satisfy degree requirements.
2. With respect to the third column (Number of graduate courses required**)**, note that one course of at most 4 units can be a UC Davis upper-division undergraduate course that was completed to satisfy the Undergraduate Proficiency Requirements.

3) **Course Requirements**

a) Core Area Requirements

At the graduate level the Computer Science curriculum is classified into four broad areas - Theory, Systems, Architecture, and Applications. The Core Area Requirement for MS Degree requires demonstrating proficiency in **three of above four areas**. A student can satisfy the Core Area Requirements in one of the following ways:

- Completing a Core course in the area with a grade of B or better for Thesis option (Plan I) or Project option (Plan II) and A- or better for Exam option (Plan II) .
- By taking a similar graduate course at another institution and earned a grade of B or better for Thesis option (Plan I) or Project option (Plan II) and A- or better for Exam option (Plan II). The student must file a form with the required information and attach the course syllabus and the official transcript

indicating the grade received. A Graduate Advisor must review and approve this option.

The following table lists the current set of course offerings for each of the Core Areas. Note that the offerings of the courses in the Application area in particular are not uniform.

Core Area	Course Number	Title	Units
Architecture	ECS 201A	Advanced Computer Architecture	4
	ECS 201C	Parallel Architectures	4
Systems	ECS 240	Programming Languages	4
	ECS 251	Programming Languages	4
	ECS 260	Software Engineering	4
Theory	ECS 220	Theory of Computation	4
	ECS 222A	Design and Analysis of Algorithms	4
Application	ECS 230	Applied Numerical Linear Algebra	4
	ECS 231	Large-Scale Scientific Computation	4
	ECS 234	Computational Functional Genomics	4
	ECS 235A	Computer and Information Security	4
	ECS 236	Computer Security Intrusion Detection Based Approach	4
	ECS 252	Computer Networks	4
	ECS 256	Performance Evaluation	4
	ECS 265	Distributed Database Systems	4
	ECS 270	Artificial Intelligence	4
	ECS 271	Machine Learning and Discovery	4
	ECS 272	Information Visualization	4
	ECS 275A	Advanced Computer Graphics	4
	ECS 276	Advanced Volume Visualization	4
	ECS 277	Advanced Visualization	4
	ECS 278	Computer-Aided Geometric Design	4
	ECS 279	Topics in Computer Animation	4

b) Course Requirements for the MS Degree

MS Plan I (Thesis Option) – Core and Electives (36 units)

i) Core Area Courses (12 units)
(1) 4 units each from three of the four Core Areas (courses listed above) and must meet the requirements stated in Section 3 (a) above.

ii) Electives (24 units)
(1) These courses should be selected in consultation with Thesis Advisor. Up to 12 units may be from ECS 299.

MS Plan II (Project Option) – Core and Electives (36 units)

i) **Core Area Courses (12 units)**
   (1) 4 units each from three of four Core Areas (courses listed above) and must meet the requirements stated in Section 3 (a) above.

ii) **Electives (24 units)**
   (1) These courses should be selected in consultation with Project Advisor. Up to 8 units may be from ECS 299.

MS Plan II (Exam Option) – Core and Electives (36 units)

i) **Core Area Courses (12 units)**
   (1) 4 units each from three of four Core Areas and must meet the requirements stated in Section 3 (a) above.

ii) **Electives (24 units)**
   (1) These courses should be selected in consultation with a Graduate Advisor. No units of ECS 299 may be counted towards the 36 units requirement.

b) Summary:
A total of 36 units of upper division and graduate coursework course work are required. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Per UC regulations students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter. A student must have a GPA of 3.0 for the M.S. degree to be awarded. Students who have not obtained a previous degree at an approved English-medium institution or demonstrated English-language proficiency through an appropriate exam (e.g. TOEFL) are required to complete appropriate English-language courses, as described in the policy Graduate Student Course Requirements – English as Second Language (GC2018-02). Courses taken in satisfaction of this requirement do not count towards the units required for graduation.

4) Special requirements: To become a Teaching Assistant (TA) for any course offered by the Department of Computer Science, a student is required to complete the course ECS 390 (Teaching of Computer Science). This course does not count towards the degree requirements.

5) Committees:

a) **Admission Committee**:
Once the completed application, all supporting material, and the application fee have been received, the application is submitted to the Admissions Committee. The Admissions Committee consists of 10 – 15 faculty who are members of GGCS. Based on a review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions is sent by Graduate Studies. Applications are due by the deadline listed on the Program website for admission to the class starting the following Fall quarter.

b) Graduate Advisors Committee:

The Graduate Advisors Committee is composed of 7 – 10 faculty members appointed by Graduate Studies. This committee is responsible for monitoring the progress of graduate students, providing guidance on their academic program, and approving course selection for MS student following the Exam Option (Plan II).

c) Thesis Committee:

For a student following Plan I (Thesis Option), the student's Thesis Advisor nominates two additional GGCS faculty members to serve on the Thesis Committee. These nominations are submitted to Graduate Studies for formal appointment in accordance with Graduate Council policy. The Thesis Advisor serves as Chair of the committee. At least two members of this committee must be members of the Academic Senate of the University of California. This follows the Policy on Membership defined in GC1998-01. At least two members of this committee must be members of GGCS. The thesis must be approved by all three members of the committee.

d) Project Committee:

For Plan II with Project Option, the student's Project Advisor nominates additional two faculty members to serve on the Project Committee. This nomination is submitted to the Graduate Advisor Committee for approval. The responsibility of this committee is to supervise and evaluate the student's project. A project must be approved all members of the Project Committee.

e) Comprehensive Exam Committee:

Each academic year, the Chair of GGCS nominates four faculty members to serve on the Comprehensive Exam Committee. The committee members must be members of GGCS. It is the responsibility of committee to administer the comprehensive exam to students enrolled in MS Plan II (Exam Option). The format of the exam is described in Section 8(c).

6) Advising Structure and Mentoring:

The Thesis Advisor is the faculty member who supervises the student's Thesis (MS Pan I (Thesis Option)). This faculty serves as the Chair of the Thesis Committee. The Project Advisor is the faculty member who supervises the student's Project (MS Pan II (Project Option)). Each Graduate Advisor, who is appointed by Graduate Studies, is a resource for information on academic requirements, identifying potential Thesis/Project Advisor, and policies and procedures until the student has a Thesis or a Project Advisor. For students following MS Plan II (Exam Option), Graduate Advisors are resource for information on academic requirements and policies and procedures for the entire duration of their program. Irrespective of their MS plan, students can continue to seek advice and mentoring from the Graduate Advisors for various reasons including potential conflicts and other issues. This may be through guidance from the Graduate Program Coordinator. The Graduate Program Coordinator also assists students with identifying a Thesis/Project Advisor, identifying Graduate Student Researcher (GSR) and Teaching Assistant (TA) appointments, and general university policies. The Mentoring Guidelines can be found in the graduate student handbook on the web at: *https://cs.ucdavis.edu/graduate/current-students/resources*

7) Advancement to Candidacy:

Every student must file an official application for Advancement to Candidacy after they have completed at least one-half of the course requirements for the degree. The Candidacy for the Degree of Master form can be found online at: http://www.gradstudies.ucdavis.edu/forms/. A completed form includes a list of courses

the student will take to complete degree requirements. For student following MS Plan II (Exam Option) a Graduate Advisor must sign the form. For students following MS Plan II (Project Option), the Project Advisor or a Graduate Advisor must sign the form. For students following MS Plan I (Thesis Option), the Thesis Advisor or a Graduate Advisor must sign the form.

If changes must be made to the student's MS Degree plan after s/he has advanced to candidacy, a Graduate Advisor must recommend these changes to Graduate Studies.

If the Advancement to Candidacy is approved, Graduate Studies the approval to the Graduate Program Coordinator, the student, and if applicable to the Thesis/Project Advisor. If Graduate Studies determines that a student is not eligible for Advancement to Candidacy, the Graduate Program Coordinator, the student, and if applicable to the Thesis/Project Advisor will be told the reasons for the deferral of Advancement to Candidacy. Some reasons for deferring an application include a) grade point average below 3.0, b) outstanding Incomplete (I) grades in required courses, or c) insufficient units. Note that the determination of the Advancement to Candidacy must be done at least one full quarter before completion of all degree requirements and before going on filing fee status.

8) Requirements for the Thesis, Project, and Comprehensive Examination:

a) **MS Plan I <u>Thesis:</u>**
The student and Thesis Advisor must meet at least once a quarter with the other two members of the Thesis Committee to discuss progress and any changes in research objectives.

Research for the MS thesis is to be carried out under the supervision of a Thesis Advisor who must be a member of GGCS. A Master's thesis is usually based on 6 to 12 ECS 299 research units. The thesis should demonstrate the student's proficiency in research methods and scientific analysis, and a thorough knowledge of the state of the art in the student's chosen area. A Master's thesis is a description of an original technical or research contribution of limited scope, or an advanced design study. The thesis research must be conducted while the student is enrolled in the program. All committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval. Should the Thesis Committee determine that the thesis is unacceptable, even with substantial revisions, the program may recommend the student for disqualification from the program to the Dean of Graduate Studies.

The Thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies.

b) **MS Plan II <u>Project:</u>**
A project is carried out under the supervision Project Advisor who must be a member of GGCS. The topic and extent of the project may be defined by a faculty member or proposed by the student. A typical project involves the practical solution (implementation) of a software system or an experimental study of a computer hardware/software design. The deliverable for a successful completion of a project is defined by the Project Advisor. It can be a written report and/or an oral presentation. All committee members must approve the project. The Master's Report Form is then signed by the Program Graduate Adviser

(Chair of GGCS) and forwarded to Graduate Studies for final approval. Should the Project Committee determine that the project outcome is unacceptable, the program may recommend the student for disqualification from the program to the Dean of Graduate Studies.

c) MS Plan II **Comprehensive Exam**

The Comprehensive Examination may be oral, written or a combination of both, designated by the Comprehensive Exam Committee, with the objective to strengthen the student's knowledge in core or applied CS areas that can best prepare the student for his/her professional career. The exam is based on material determined by the Comprehensive Exam Committee. The following are two examples of the Comprehensive Exam.

1) The Comprehensive Exam Committee chooses three important and highly established published papers from three of the Core Areas. The exam consists of reading the paper and answering a set of questions posed by the Comprehensive Exam Committee. The questions require written answers and may involve programming and/or computation.

2) The Comprehensive Exam Committee chooses a set of important topics covered in the Core Areas. The exam consists of the students answering questions on the topics. Whether it will be a written exam or an oral exam is determined by the Comprehensive Exam Committee.

The examination may be taken once the student has completed required courses and advanced to candidacy. Comprehensive Exam is held in Fall, Winter, and Spring quarters. Student with discussion with the Graduate Coordinator will decide when to take the exam. A student is allowed to repeat the Comprehensive Examination only once. After passing the examination, a copy of the Master's Report Form (found at http://www.gradstudies.ucdavis.edu/forms/) is signed by the Graduate Advisor and then forwarded to the Graduate Studies.

If a student does not pass the exam on the first attempt, the student must retake the Comprehensive Exam and pass or take a remedial course and get a grade of A- or better. The remedial course is determined by Comprehensive Exam Committee. A student who does not pass on the second attempt or get a grade of A- or better in the remedial course will be recommended for disqualification to the Dean of Graduate Studies.

For both MS Plan II (Project Option and Exam Option), a candidate must be a registered student or in Filing Fee status at the time the program submits the form, with the exception of the summer period between the end of the Spring Quarter and the beginning of Fall Quarter. The program must file the Form with Graduate Studies within one week of the end of the quarter in which the student's degree will be conferred.

9) Normative Time to Degree:

MS Plan I Normative Time to Degree: It is expected that the student will complete the Core Area Requirements within the first four (4) quarters of residence. It is expected that the student will complete the MS Degree by the end of the sixth (6^{th}) quarter of residence, including all course requirements and the approval of the thesis.

MS Plan II Normative Time to Degree: It is expected that the student will complete the Core Area Requirements within the first four (4) quarters of residence. It is expected that

the student will complete all course work and project/examinations by the end of the fifth (5^{th}) quarter of residence.

These deadlines may be extended only by an approval of a Graduate Advisors.

10) Typical Timeline and Sequences of Events

Thesis	Year 1	Year 2
Fall	ECS201A, ECS299, ECS 293, ECS 390	ECS299, ECS235A
Winter	ECS222A, ECS240, ECS299	ECS299; advancement to candidacy
Spring	ECS265, ECS270, ECS299	ECS299; thesis completed

Project	Year 1	Year 2
Fall	ECS201A, ECS275, ECS 293, ECS 390	ECS260; ECS299; advancement to candidacy
Winter	ECS222A, ECS272, ECS 299	ECS299; project completed
Spring	ECS265, ECS277, ECS 299	

Exam	Year 1	Year 2
Fall	ECS201A; ECS260	ECS235A; ECS252; advancement to candidacy
Winter	ECS222A; ECS240	ECS299; exam passed
Spring	ECS265; ECS270	

The following are important notes related to the above table.

1. ECS 299 units are assigned to meet the 12 units requirements for the quarter.
2. Course offerings change year to year. What is shown is just an example.
3. These samples do not take into account the student's need of fulfilling certain undergraduate proficiency requirements. Depending on the added workload, the student may need additional quarters to complete the exam/project/thesis.

11) Sources of funding

Financial assistance for graduate study comes in the form of Fellowships, Teaching Assistant (TA) and Graduate Student Research (GSR) positions.

12) PELP, In Absentia, and Filing Fee Status

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found at the Graduate Studies website: https://grad.ucdavis.edu/academics/registration/options-non-registered-students

Ph.D. Degree Requirements

1.) Admissions Requirements: Consideration for program admission requires a bachelor's degree, three letters of recommendation, a completed application form including Statement of Purpose, Personal History and Diversity Statement, official transcripts, TOEFL or IELTS score (if applicable) and Office of Graduate Studies online application with fee by the stated admission deadline. GRE scores are not required.

a.) Proficiency Requirements: In addition to the admission requirements stated above, applicants are expected to demonstrate proficiency at the undergraduate level in five fundamental areas of computer science and in mathematics. These are referred to as the **Undergraduate Proficiency Requirements**. A student must satisfy the undergraduate proficiency requirements by demonstrating proficiency at the undergraduate level in the following areas equivalent to the following UC Davis courses listed below:

Area	**UC Davis Course**
Computer Architecture	ECS154A (Computer Architecture)
Operating Systems	ECS150 (Operating Systems)
Programming Languages	ECS140A (Programming Languages)
Theoretical Foundations	ECS120 (Theory of Computations) or ECS122A (Algorithm Design and Analysis)
Mathematical Foundations	ECS132 (Probability & Statistical Modeling for Computer Science) or MAT135A (Probability) or STA131A (Probability Theory) and one additional mathematics course at the upper division level

Courses taken outside the university are petitioned and reviewed to establish equivalency.

b) **Deficiencies**: It is expected that the student will complete the Undergraduate Proficiency Requirements by the end of the first academic year of residence. This deadline may be extended only by approval of the Graduate Advisors Committee of the Graduate Group.

2) Dissertation Plan:
Plan B. Specifies a three-member (minimum) dissertation committee and a mandatory exit seminar.

3) Course Requirements (45 units)

a) Core Area Requirements

At the graduate level the Computer Science curriculum is classified into four core areas - Theory, Systems, Architecture, and Applications. The Core Area Requirements include demonstrated proficiency in these four areas. The student can satisfy the Core Area Requirements in one of the following two ways:

1) Completion of a Core Area course with a grade of "A-" or better.

2) Complete a similar graduate course taken at another institution with a grade of A- or better. In this case the student must file a form and attach the syllabus of the course and an official transcript showing the grade received for the course. A Graduate Advisor must review and approve this option.

The following table gives a list of current Core courses in each Core Areas.

Core Area	Course Number	Title	Units
Architecture	ECS 201A	Advanced Computer Architecture	4
	ECS 201C	Parallel Architectures	4
Systems	ECS 240	Programming Languages	4
	ECS 251	Programming Languages	4
	ECS 260	Software Engineering	4
Theory	ECS 220	Theory of Computation	4
	ECS 222A	Design and Analysis of Algorithms	4
Application	ECS 230	Applied Numerical Linear Algebra	4
	ECS 231	Large-Scale Scientific Computation	4
	ECS 234	Computational Functional Genomics	4
	ECS 235A	Computer and Information Security	4
	ECS 236	Computer Security Intrusion Detection Based Approach	4
	ECS 252	Computer Networks	4
	ECS 256	Performance Evaluation	4
	ECS 265	Distributed Database Systems	4
	ECS 270	Artificial Intelligence	4
	ECS 271	Machine Learning and Discovery	4
	ECS 272	Information Visualization	4
	ECS 275A	Advanced Computer Graphics	4
	ECS 276	Advanced Volume Visualization	4
	ECS 277	Advanced Visualization	4
	ECS 278	Computer-Aided Geometric Design	4
	ECS 279	Topics in Computer Animation	4

b) **Course Requirements for the Ph.D. Degree (45 units)**

i) Core Area Courses (16 units)

(1) 4 units each from each of the four Core Areas (courses listed above) and must meet the requirements stated in Section 3 (a) above.

ii) Electives (29 units)

(1) These courses should be selected in consultation with the Major Professor. Up to 6 units may be from ECS 299.

c) **Summary:** A total of 45 units of graduate coursework are required, including up to 6 units of ECS 299. A maximum of 4 units of upper division course taken at UCDavis. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Per UC regulations students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter. Students who have not obtained a previous degree at an approved English-medium institution or demonstrated English-language proficiency through an appropriate exam (e.g. TOEFL) are required to complete appropriate English-language courses, as described in the policy Graduate Student Course Requirements – English as Second Language (GC2018-02). Courses taken in satisfaction of this requirement do not count towards the units required for graduation.

d) Special Requirements: To become a Teaching Assistant (TA) for any course offered by the Department of Computer Science, a student is required to complete the course ECS 390 (Teaching of Computer Science). This course does not count towards the degree requirements.

The Graduate Group requires all Ph.D. candidates demonstrate at least one quarter of University/College–level teaching experience. Following are examples of how this can be fulfilled

a) Being a Teaching Assistant (TA) in a course which includes lecturing or leading a discussion section.
b) Teaching a course at a Community College or California State University.
c) Being an Associate Instructor for a course at UC Davis.

In addition, each student is required to participate in an exit seminar, in which the research is presented to the UC Davis academic community. This seminar will be administered by the dissertation committee and will take place after all committee members have approved the dissertation, but before the dissertation has been filed with Graduate Studies.

5) Committees

a) Admissions Committee

Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of 10-15 graduate program faculty. Based on a review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions is sent by Graduate Studies.

b) Course Guidance or Advising Committee

The student, in conjunction with the Major Professor[1], develops the program of study for a PhD student. All programs of study must be approved by the Educational Policy Committee of GGCS. No course with a grade less than a B will be accepted on the program of study.

[1] Major Professor is the same as the Research Advisor. The Major Professor is also the Chair of the Dissertation Committee.

c) **Qualifying Examination (QE) Committee**

The student, in consultation with his/her Major Professor, must nominate five committee members to serve on the Qualifying Examination Committee. The five-member committee must include the Major Professor who must be selected before the Qualifying Examination Committee is formed. One of the committee members is selected to be the Chair of Qualifying Exam Committee. The membership of the Qualifying Exam Committee must satisfy the following conditions: 1) The chair of the committee must be a member of the Academic Senate of UC Davis, and a GGCS member; 2) The Major Professor must be on the Qualifying Exam Committee but cannot be chair of the committee; 3) At least three members of the committee must be faculty members of the Academic Senate of the University of California and GGCS members; 4) As external (non-UC Davis) personnel routinely play major roles in collaborating with and mentoring graduate students, at most one can serve on the Qualifying Examination Committee, if approved. An external committee member should avoid any real or perceived conflict of interest (COI) with the student. If there appeared any perceived COI (e.g., the external member and the student are employed by the same company), the student should provide statements explaining why the COI does not exist. GGCS Educational Policy Committee will review the statements.

The five nominations (along with any COI statement from the student) are submitted to Graduate Studies for formal approval in accordance with Graduate Council policy. The Qualifying Exam Committee conducts the exam and submits results to Graduate Studies.

e) Dissertation Committee

The PhD Dissertation Committee consists of three members who will guide the student towards their PhD Degree (GC1998-01). Guidelines for choosing the members of the dissertation committee are the following: 1) the PhD dissertation committee will be composed of at least three members; 2) At least two of these members must be members of the Academic Senate of the University of California, 3) At least two of these members must be members of GGCS; 4) The Chair of this committee is the Major Professor who must be a member of GGCS . The composition of the dissertation committee is entered on the Advancement to Candidacy Form and must be approved by Graduate Studies.

The role of the Dissertation Committee is to advise the doctoral student on the research topic and methods, and then to review the final completed dissertation for acceptance. The Chair of the Dissertation Committee should determine the scope and desire of each individual committee member regarding their involvement and assistance with the research and dissertation review at the time the dissertation committee is constituted. Students are expected to meet with the Chair of the Dissertation Committee quarterly. Dissertation Committee members are expected to read and comment on a dissertation within four weeks from its submission. This time limit policy does not apply to summer periods for faculty holding nine-month appointments. The student and the Chair of the Dissertation Committee will coordinate a timeline for the student to present the thesis to the Dissertation Committee. This timeline must allow all Dissertation Committee members enough time to fulfill their responsibilities within the four-week deadline.

f) Graduate Advisors Committee:

The Graduate Advisors Committee is composed of 7 – 10 faculty members appointed by Graduate Studies. For a PhD student the role of the Graduate Advisors Committee is to provide support in case of conflicts and other academic issues that the student may need to address without involving the Major Professor.

6) Advising Structure and Mentoring: The **Major Professor** is the faculty member who supervises the student's research and dissertation. This person must be a member of the GGCS and serves as the Chair of the Dissertation Committee. **Graduate Advisors**, who are appointed by Graduate Studies, is a resource for information on academic requirements, policies and procedures, and registration information. The Graduate Program Coordinator(s) assists students with identifying a Major Professor, identifying TA and GSR appointments, and general university policies. The **Mentoring Guidelines** can be found in the graduate student handbook on the web at: https://cs.ucdavis.edu/graduate/current-students/resources.

7) Advancement to Candidacy: Before advancing to candidacy for PhD, a student must have satisfied all requirements set by the graduate program, must have maintained a minimum GPA of 3.5 in all course work undertaken (except those courses graded S or U), and must have passed the Qualifying Examination. It is a GGCS policy that students must pass their QE by the end of the ninth quarter in order to remain eligible for Teaching Assistant (TA) and Associate Instructor (AI) appointments. The student must file the appropriate paperwork with Graduate Studies and pay the candidacy fee in order to be officially promoted to be a candidate for PhD.

8) Qualifying Examination and Dissertation Requirements

a. Qualifying Examination

1. General Information

To be eligible for the Qualifying Examination, the student must have satisfied all course requirements, have removed all deficiencies, and must have at least a 3.5 GPA in courses taken in the program of study. The student in consultation with her Major Professor determines a major and minor areas for her research. The major area reflects the main sub-area of Computer Science that is closest to the research topic. The minor area corresponds to a related field or another sub-area within Computer Science that is relevant to the student's research topic. For example, a student proposing to do research in Optical Networks would list Computer Networks as the major area and Optimization as a minor area. This is indicated in the program of study that is submitted to Graduate Studies 1 month prior to the Qualifying Examination.

The Qualifying Examination is administered by the Qualifying Exam Committee and passing this exam makes the student eligible to advance to become a candidate for PhD. The Qualifying Exam should be taken by the ninth quarter and no later than the end of the fifteenth quarter after admission to the PhD program.

The primary purpose of the Qualifying Examination is to validate that the student is academically qualified to conceptualize a research topic, to undertake scholarly research and to successfully produce the dissertation required for a doctoral degree. The Qualifying Examination is intended to evaluate the student's command of the field, ensuring that the student has both breadth and depth of knowledge, and must not focus solely on the proposed dissertation research. In addition, the Qualifying Examination provides an opportunity for the committee to provide important guidance to the student regarding his or her chosen research topic.

The Qualifying Examination is a formal examination to ascertain the student's readiness to conduct PhD level research. It consists of two parts – a written portion and an opal portion. Prior to the oral portion of the Qualifying Examination, the student must prepare a Dissertation Prospectus (more commonly referred to as the Research Proposal) containing a thorough discussion of a proposed thesis topic. The Research Proposal is the written portion of the Qualifying Examination.

2. Written Portion of the Qualifying Examination

The written portion of the exam consists of a Research Proposal (more formally referred to as the Dissertation Prospectus). The Research Proposal should be provided to the members of the Qualifying Examination Committee at least two weeks before the Qualifying Exam. The Research Proposal is an independently prepared proposal describing the student's dissertation-specific research aims, hypotheses, progress to date, and approach. Concepts within the research proposal can be discussed with others (such as the student's Major Professor and peers), but the writing of the proposal should be solely the student's work (i.e., no editorial assistance is allowed) as the proposal will serve as evidence of the student's proficiency in scientific writing. The length of the Research Proposal is determined by the student in consultation with her Major Professor.

The Qualifying Examination committee will be responsible for assessing the quality and the feasibility of the proposed research. They will be responsible for assessing that the student's writing proficiency is satisfactory before advancement to candidacy. Furthermore, the Research Proposal will provide information that may be discussed during the oral portion of the Qualifying Examination.

3. Oral Portion of the Qualifying Examination

The oral portion of the Qualifying Examination will be up to 3 hours in length. While the examinations may differ in structure, depending on the area of research and the members of the examining committee, the common prescribed format consists of two parts. In the first part of this examination the student will be asked to give a presentation of the Research Proposal. The committee may question the student on the proposal to assess her understanding of the research topic, the prior art, the validity of the hypostasis, and the feasibility of the approach. Typically, the recommended time for this presentation without any questions is 45 to 50 minutes. However, with questions, this can be longer. In the second part of oral portion of the Qualifying Examination, the committee member will question the student to determine the student's competence in both the major and minor areas of study. The goal is to assess if the student is proficient in the background material that will be required to successfully complete the proposed research.

The committee will evaluate the student's general qualifications for a respected position as an educator or leader as well as the student's preparation in a special area of study based upon relevant portions of the student's previous academic record, performance on specific parts of the examination, and the student's potential for scholarly research as indicated during the examination.

4. Outcome of the Qualifying Examination

The committee can issue the following grades for the examination:

Pass – In this case student can apply to Graduate Studies for Advancement to Candidacy for the PhD degree. At this time a Dissertation Committee is officially selected to direct the student in the research, and to guide the student in the preparation of the dissertation. The committee must be approved by Graduate Studies.

Not Pass - In this case, the committee has two options:

1. It can decide that the student's research proposal is not sufficient and ask that it be re-thought/re-written to better reflect a PhD-level research project. In this case, the committee will ask the student to remedy the deficiencies in the proposal and retake the Qualifying Examination within a specified time frame.

2. It can decide that the student's knowledge within the major and minor areas is not sufficient for continued progress for the PhD. In this case, the committee can ask the student to take some additional course work and retake the Qualifying Examination within a specified time frame.

Fail—In this case, the student is not permitted to continue in the PhD program.
The committee can meet with the major advisor as part of its deliberations.

The student can only retake the Qualifying Examination once. If a passing grade is not achieved by the second attempt, the student cannot continue in the PhD program.

If a unanimous decision takes the form of "Not Pass" or "Fail", the Chair of the Qualifying Examination committee must include in its report a specific statement, agreed to by all members of the committee, explaining its decision and must inform the student of its decision. Having received a "Not Pass" the student may attempt the Qualifying Examination one additional time. The Qualifying Examination report must list the specific conditions and timing for the second exam. After a second examination, a vote of "Not Pass" is unacceptable; only "Pass" or "Fail" is recognized. Only one retake of the Qualifying Examination is allowed. Should the student receive a "Fail" on the first or second attempt at the exam, the student will be recommended for disqualification from the program to the Dean of Graduate Studies.

b. The Dissertation

1. Exit Seminar

Each student is required to participate in an exit seminar, in which the candidate's research is presented to the UC Davis academic community. This seminar will be administered by the Dissertation Committee and will take place after all committee members have approved the dissertation, but before the dissertation has been filed with Graduate Studies. The seminar should have a duration of 1 hour consisting of a talk by the student of duration 50 minutes long with 10 minutes allowed for questions. The seminar is attended by the Dissertation Committee and open to the general public. Adequate scheduling of the exit seminar is the responsibility of the student.

2. General Requirements

Filing of a Ph.D. dissertation with Graduate Studies is normally the last requirement satisfied by the candidate. The deadlines for completing this requirement are listed each quarter in the campus General Catalog (available online at the website of the Office of the Registrar or from the Bookstore). A candidate must be a registered student or in Filing Fee status at the time of filing a dissertation, with the exception of the summer period between the end of the Spring Quarter and the beginning of Fall Quarter. The PhD. Dissertation will be prepared, submitted and filed according to regulations instituted by Graduate Studies http://gradstudies.ucdavis.edu/students/filing.html. Satisfaction of this requirement must be verified by the Chair of the Dissertation Committee Chair who is also the Major Professor.

3. Dissertation

The PhD dissertation demonstrates the ability of the student to carry out an independent original research project of high quality. It reflects a level of attainment in research and not the fulfillment of a list of requirements. An acceptable Ph.D. dissertation is not only an original contribution to the field, but it is generally characterized by a broad scope of universal applicability. The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects to make requested revisions; committee members are must respond within 4 weeks, not including summer months for nine-month faculty. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame. The dissertation must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval.

9) Normative Time to Degree:

It is expected that the student will complete the breadth requirements within the first four quarters of study, the advanced proficiency requirements within the first six quarters of study, and the Qualifying Examination between the sixth and ninth quarters of study. Completion of all requirements is normally accomplished in fifteen quarters of study.

Students who fail to complete all the requirements within the normative time period are referred to the Educational Policy Committee of the Graduate Group. The Committee considers the student's entire record, including grades, SPA reports and solicited letters of support, particularly from the student's Major Professor. The Committee exercises wide discretion: it may decide that no action is necessary (i.e., when a student has one or more quarters to complete the requirements); that the student should be allowed more time in which to complete the requirement; that certain of the requirements should be waived; that certain remedial actions should be taken; or that the student should be advised to leave the program. The committee attaches great weight to the Major Professor's letter of support. It is therefore extremely important that students involve themselves in research under some faculty member very early in the program - preferably by the end of their third quarter.

10) Typical Timeline and Sequence of Events

Year One	Fall	Winter	Spring
	ECS 201A ECS 235A ECS 299	ECS 222A ECS 240 ECS 299	ECS 252 ECS 251 ECS 299

Year Two	*ECS 260* *ECS 299* *(Program of Study submitted and approved)*	*ECS 272* *ECS 299* *(Advanced Proficiency Requirement completed)*	*ECS 299* *(Application for Qualifying Examination submitted)*
Year Three	ECS 299 Qualifying Exam *(Advancement to PhD Candidacy)*	ECS 299	ECS 299
Years Four – Six	ECS 299 *(Dissertation Research Completion, Exit Seminar Completion)*		

The following are important notes related to the above table.

1. ECS 299 units are assigned to meet the 12 units requirements for the quarter.
2. Course offerings change year to year. What is shown is just an example.
3. These samples do not take into account the student's need of fulfilling certain undergraduate proficiency requirements. Depending on the added workload, the student may need additional quarters to complete the exam/project/thesis.

11) Sources of funding.

Financial assistance for graduate study comes in the form of fellowships, Teaching Assistant (TA) and Graduate Student Research (GSR) positions. The standard form of PhD student support is a 50% TA position for the first three quarters and either a 50% TA or 47% GSR position for the remainder of a student's academic career. The amount and type of aid that the Graduate Group can offer varies from year to year depending on the number of TA and GSR positions that are available, the fellowships that the Graduate Group is authorized to award, and the number of students requesting financial assistance.

We strongly encourage all qualified applicants to apply for many external fellowships offered by both government and private agencies. Recipients of fellowships such as NSF, NPSC, and DOE fellowships are highly regarded as applicants.

12) PELP, In Absentia and Filing Fee status.

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found at the Graduate Studies website: https://grad.ucdavis.edu/current-students/forms-information

13) Leaving the Program Prior to Completion of the PhD Requirements.

Should a student leave the program prior to completing the requirements for the PhD, he or she may still be eligible to receive the Masters if they have fulfilled all the requirements

(see Masters section). Students can use the Change of Degree Objective form available from the Registrar's Office: https://local-resources.ucdavis.edu/local_resources/forms/D065-graduate-major-degree-change.pdf

Integrated BS/MS Plan Requirements

1) **Admissions requirements**: Applicants to the integrated BS/MS plan are required to complete the standard application process for the M.S. program. Notification of admissions decisions is sent by Graduate Studies. Applications are due by the deadline listed on the Program website for admission to the class starting the following Fall quarter. Students in the Computer Science or Computer Science and Engineering majors may apply during the students' Junior or Senior year. Consideration for admission to the BS/MS program requires a UC GPA of 3.7 or higher, a bachelor's degree (must be awarded before starting graduate-level study), three letters of recommendation, a completed application form including Statement of Purpose, Personal History and Diversity Statement, official transcripts, and Graduate Studies online application with fee by the stated admission deadline. GRE scores are not required. Applicants should indicate in their Statement of Purpose that they are applying to the integrated BS/MS plan.

   a) **Prerequisites:** In addition to the admission requirements stated above, applicant must be current UC Davis undergraduate of Senior standing who will graduate under one of the following majors: Computer Science, Computer Science and Engineering, or Computer Engineering. Applicants are expected to be in good academic standing and must have completed at least 90 units total at the time they apply.

2) **BS/MS Plan I and Plan II**

   The Graduate Group in Computer Science (GGCS) offers two plans for the MS Degree: Plan I requires a thesis, and Plan II requires either a project or a comprehensive final examination. Students in consultation with a Graduate Advisor, should decide which plan best suits their individual goals. Students decide on the Plan at the end of 3rd quarter of the MS portion of their program. The comprehensive exam is typically taken during the final quarter. Students can switch MS plan before advancing to candidacy which typically occurs the quarter before they graduate.

   Plan I gives the student an opportunity to perform in-depth research and thesis writing, whereas Plan II allows the student to obtain an extensive hands-on project experience, or ensures comprehensive capstone testing the student on selected core/applied CS subject areas. BS/MS Plan I requires 32 units of upper division and graduate course work, and BS/MS Plan II requires 36 units of upper division and graduate course work. At most 4 units of upper-division undergraduate course work, completed during graduate-level, may be counted toward the 32 units or 36 units requirement for Plan I or Plan II, respectively.

   The following table summarizes specific requirements for the thesis, project, and comprehensive examination.

Option	Format and requirements	Number of graduate courses required	Number of ECS 299 units allowed	Committee
Thesis (Plan I)	A written thesis	5	12	Thesis advisor plus 2 faculty members

Project (Plan II)	Project deliverable	7	8	Project advisor plus 2 faculty members
Exam (Plan II)	Comprehensive Exam	9	0	Comprehensive Exam Committee

Note that while the allowed ECS 299 units may be counted toward the 32 unit or 36 unit requirement, ECS 293A, ECS 298, ECS 299, and ECS 390 cannot be counted toward the required graduate courses. A grade of B or better must be obtained in all coursework used to satisfy degree requirements. At most 4 units of upper-division undergraduate course work, completed during graduate-level, may be counted toward the 32 units or 36 units requirement for Plan I or Plan II, respectively.

3) Course Requirements (32 units)

a) Core Area Requirements

At the graduate level the Computer Science curriculum is classified into four broad areas - Theory, Systems, Architecture, and Applications. The Core Area Requirement for MS Degree requires demonstrating proficiency in **three of above four areas**. The student can satisfy the Core Area requirements in one of the following ways:

- Completing a Core course in the area with a grade of B or better.
- Demonstrating that one has taken a similar graduate course at another institution and earned a grade of B or better. A Graduate Advisor must approve this option.

Core Area	Course Number	Title	Units
Architecture	ECS 201A	Advanced Computer Architecture	4
	ECS 201C	Parallel Architectures	4
Systems	ECS 240	Programming Languages	4
	ECS 251	Programming Languages	4
	ECS 260	Software Engineering	4
Theory	ECS 220	Theory of Computation	4
	ECS 222A	Design and Analysis of Algorithms	4
Application	ECS 230	Applied Numerical Linear Algebra	4
	ECS 231	Large-Scale Scientific Computation	4
	ECS 234	Computational Functional Genomics	4
	ECS 235A	Computer and Information Security	4
	ECS 236	Computer Security Intrusion Detection Based Approach	4
	ECS 252	Computer Networks	4
	ECS 256	Performance Evaluation	4
	ECS 265	Distributed Database Systems	4

	ECS 270	Artificial Intelligence	4
	ECS 271	Machine Learning and Discovery	4
	ECS 272	Information Visualization	4
	ECS 275A	Advanced Computer Graphics	4
	ECS 276	Advanced Volume Visualization	4
	ECS 277	Advanced Visualization	4
	ECS 278	Computer-Aided Geometric Design	4
	ECS 279	Topics in Computer Animation	4

b) Course Requirements for the MS Degree

MS Plan I (Thesis option) – Core and Electives (32 units)

iii) Core Area Courses (12 units)
(1) 4 units each from three of four Core Areas (courses listed above) and must meet the requirements stated in Section 3 (a) above.

iv) Electives (18 units)
(1) These courses should be selected in consultation with committee members. Up to 12 units may be from ECS 299.

MS Plan II (Project Option) – Core and Electives (36 units)

i) Core Area Courses (12 units)
(1) 4 units each from three of four Core Areas (courses listed above) and must meet the requirements stated in Section 3 (a) above.

ii) Electives (24 units)
(1) These courses should be selected in consultation with committee members. Up to 8 units may be from ECS 299.

MS Plan II (Exam Option) – Core and Electives (36 units)

iii) Core Area Courses (12 units)
(1) 4 units each from three of four Core Areas (courses listed above). Exam option students must pass the Core Area courses with a grade of A- or higher.

iv) Electives (24 units)
(1) These courses should be selected in consultation with committee members. Up to 4 units of ECS 299 may be counted towards the 36 unit requirement.

c) Course Transfer and Credits:

i) Up to 4 units of upper-division undergraduate course work (i.e., one course) with a grade of A- or better and that are not used to satisfy the BS degree requirement may be applied towards the Master's degree requirements of the integrated BS/MS program as an elective course.
ii) Up to 8 units of graduate-level course work (i.e., two (2) courses) taken during the BS portion of the program with a grade of A- or better and that are not used to satisfy the

BS degree requirements may be transferred and counted towards the Master's degree requirements of the integrated BS/MS program as either a Core Area course or an elective course.

d) Summary:

BS/MS Plan I requires a total of 32 units of upper-division and graduate-level course work, and BS/MS Plan II requires a total of 36 units of upper-division and graduate-level course work. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Per UC regulations, students cannot enroll in more than 12 units of graduate-level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter. A student must have a GPA of 3.0 for the MS degree to be awarded.

4) Special requirements: To become a Teaching Assistant (TA) for any course offered by the Department of Computer Science, a student is required to complete the course ECS 390 (Teaching of Computer Science). This course does not count towards the degree requirements.

5) Committees:

a) **Admission Committee**:

Once the completed application, all supporting material, and the application fee have been received, the application is submitted to the Admissions Committee. The Admissions Committee consists of 10 – 15 faculty who are members of GGCS. Based on a review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions is sent by Graduate Studies. **Applications are due by the deadline listed on the Program website** for admission to the class starting the following Fall quarter.

b) Graduate Advisors Committee:

The Graduate Advisors Committee is composed of 7 – 10 faculty members appointed by Graduate Studies. This committee is responsible for monitoring the progress of graduate students, providing guidance on their academic program, and approving course selection for MS student following the Exam Option (Plan II).

c) Thesis Committee:

For a student following Plan I (Thesis Option), the student's Thesis Advisor nominates two additional GGCS faculty members to serve on the Thesis Committee. These nominations are submitted to Graduate Studies for formal appointment in accordance with Graduate Council policy. The Thesis Advisor serves as Chair of the committee. At least two members of this committee must be members of the Academic Senate of the University of California. This follows Policy on Membership defined in GC1998-01. At least two members of this committee must be members of GGCS. The thesis must be approved by all three members of the committee.

d) Project Committee:

For Plan II with Project Option, the student's Project Advisor nominates additional two faculty members to serve on the Project Committee. This nomination is submitted to the Graduate Advisor Committee for approval. The responsibility of this committee is to supervise and evaluate the student's project. A project must be approved all members of the committee.

e) <u>Comprehensive Exam Committee</u>:

Each academic year, the Chair of GGCS nominates four faculty members to serve on the Comprehensive Exam Committee. The committee members must be members of GGCS. It is the responsibility of committee to administer the comprehensive exam to students enrolled in MS Plan II (Exam Option). The format of the exam is described in Section 8(c).

6) **Advising Structure and Mentoring:** Thesis Advisor is the faculty member who supervises the student's Thesis (MS Pan I (Thesis Option)). This faculty serves as the Chair of the Thesis Committee. The Project Advisor is the faculty member who supervises the student's Project (MS Pan II (Project Option)). Each Graduate Advisor, who is appointed by Graduate Studies, is a resource for information on academic requirements, identifying potential Thesis/Project Advisor, and policies and procedures until the student has a Thesis or a Project Advisor. For students following MS Plan II (Exam Option), Graduate Advisors are resource for information on academic requirements and policies and procedures for the entire duration of their program. Irrespective of their MS plan, students can continue to seek advice and mentoring from the Graduate Advisors for various reasons including potential conflicts and other issues. This may be through guidance from the Graduate Program Coordinator. The Graduate Program Coordinator also assists students with identifying a Thesis/Project Advisor, identifying Graduate Student Research (GSR) and Teaching Assistant (TA) appointments, and general university policies. The Mentoring Guidelines can be found in the graduate student handbook on the web at: https://cs.ucdavis.edu/graduate/current-students/resources.

7) **Advancement to Candidacy:** Every student must file an official application for Advancement to Candidacy after they have completed at least one-half of the course requirements for the degree. The Candidacy for the Degree of Master form can be found online at: http://www.gradstudies.ucdavis.edu/forms/. A completed form includes a list of courses the student will take to complete degree requirements. For student following MS Plan II (Exam Option) a Graduate Advisor must sign the form. For students following MS Plan II (Project Option), the Project Advisor or a Graduate Advisor must sign the form. For students following MS Plan I (Thesis Option), the Thesis Advisor or a Graduate Advisor must sign the form.

   If changes must be made to the student's MS Degree plan after s/he has advanced to candidacy, a Graduate Advisor must recommend these changes to Graduate Studies.

   If the Advancement to Candidacy is approved, Graduate Studies the approval to the Graduate Program Coordinator, the student, and if applicable to the Thesis/Project Advisor. If Graduate Studies determines that a student is not eligible for Advancement to Candidacy, the Graduate Program Coordinator, the student, and if applicable to the Thesis/Project Advisor will be told the reasons for the deferral of Advancement to Candidacy. Some reasons for deferring an application include a) grade point average below 3.0, b) outstanding Incomplete (I) grades in required courses, or c) insufficient units. Note that the determination of the

Advancement to Candidacy must be done at least one full quarter before completion of all degree requirements and before going on filing fee status.

8) Requirements for the Thesis:

a) MS Plan I Thesis
The student and Thesis Advisor must meet at least once a quarter with the other two members of the Thesis Committee to discuss progress and any changes in research objectives.

Research for the MS thesis is to be carried out under the supervision of a Thesis Advisor who must be a member of GGCS. A Master's thesis is usually based on 6 to 12 ECS 299 research units. The thesis should demonstrate the student's proficiency in research methods and scientific analysis, and a thorough knowledge of the state of the art in the student's chosen area. A Master's thesis is a description of an original technical or research contribution of limited scope, or an advanced design study. The thesis research must be conducted while the student is enrolled in the program. All committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval. Should the Thesis Committee determine that the thesis is unacceptable, even with substantial revisions, the program may recommend the student for disqualification from the program to the Dean of Graduate Studies.

The Thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies.

b) MS Plan II Project
A project is carried out under the supervision Project Advisor who must be a member of GGCS. The topic and extent of the project may be defined by a faculty member or proposed by the student. A typical project involves the practical solution (implementation) of a software system or an experimental study of a computer hardware/software design. The deliverable for a successful completion of a project is defined by the Project Advisor. It can be a written report and/or an oral presentation. All committee members must approve the project. The Master's Report Form is then signed by the Program Graduate Adviser (Chair of GGCS) and forwarded to Graduate Studies for final approval. Should the Project Committee determine that the project outcome is unacceptable, the program may recommend the student for disqualification from the program to the Dean of Graduate Studies.

c) MS Plan II Comprehensive Exam

The Comprehensive Examination may be oral, written or a combination of both, designated by the Comprehensive Exam Committee, with the objective to strengthen the student's knowledge in core or applied CS areas that can best prepare the student for his/her professional career. The exam is based on material determined by the Comprehensive Exam Committee. The following are two examples of the Comprehensive Exam.
1) The Comprehensive Exam Committee chooses three important and highly established published papers from three of the Core Areas. The exam consists of reading the paper and answering a set of questions posed by the Comprehensive Exam

Committee. The questions require written answers and may involve programming and/or computation.

2) The Comprehensive Exam Committee chooses a set of important topics covered in the Core Areas. The exam consists of the students answering questions on the topics. Whether it will be a written exam or an oral exam is determined by the Comprehensive Exam Committee.

The examination may be taken once the student has completed required courses and advanced to candidacy. Comprehensive Exam is held in Fall, Winter, and Spring quarters. Student with discussion with the Graduate Coordinator will decide when to take the exam. A student is allowed to repeat the Comprehensive Examination only once. After passing the examination, a copy of the Master's Report Form (found at http://www.gradstudies.ucdavis.edu/forms/) is signed by the Graduate Advisor and then forwarded to the Graduate Studies.

If a student does not pass the exam on the first attempt, the student must be retake the Comprehensive Exam and pass or take a remedial course and get a grade of A- or better. The remedial course is determined by Comprehensive Exam Committee. A student who does not pass on the second attempt or get a grade of A- or better in the remedial course will be recommended for disqualification to the Dean of Graduate Studies.

For both MS Plan II (Project Option and Exam Option), a candidate must be a registered student or in Filing Fee status at the time the program submits the form, with the exception of the summer period between the end of the Spring Quarter and the beginning of Fall Quarter. The program must file the Form with Graduate Studies within one week of the end of the quarter in which the student's degree will be conferred.

9) Normative Time to Degree for the MS Portion:

Plan I Normative Time to Degree: It is expected that the student will complete the M.S. degree by the end of the sixth (6^{th}) quarter of graduate status at the University, including all course requirements and the approval of the thesis.

Plan II Normative Time to Degree: It is expected that the student will complete the breadth requirements within the first four (4) quarters of residence. It is expected that the student will complete all course work and project/examinations by the end of the fifth (5^{th}) quarter of residence.

These deadlines may be extended only by approval of the Graduate Advisors Committee of the Graduate Group.

10) Typical Time Line and Sequences of Events during the MS Portion:

Thesis	Year 1	Year 2
Fall	ECS201A, ECS299	ECS299, ECS235A
Winter	ECS222A, ECS240, ECS299	ECS299; advancement to candidacy
Spring	ECS265, ECS270, ECS299	ECS299; thesis completed

Project	Year 1	Year 2
Fall	ECS201A, ECS275	ECS260; ECS299; advancement to candidacy
Winter	ECS222A, ECS272	ECS299; project completed
Spring	ECS265, ECS277	

Exam	Year 1	Year 2
Fall	ECS201A; ECS260	ECS235A; ECS252; advancement to candidacy;
Winter	ECS222A; ECS240	ECS299; exam passed
Spring	ECS265; ECS270	

The following are important notes related to the above table.

1. ECS 299 units are assigned to meet the 12 units requirements for the quarter.
2. Course offerings change year to year. What is shown is just an example.
3. These samples do not take into account the student's need of fulfilling certain undergraduate proficiency requirements. Depending on the added workload, the student may need additional quarters to complete the exam/project/thesis.

11) Sources of funding

Financial assistance for graduate study comes in the form of fellowships, Teaching Assistant (TA) and Graduate Student Research (GSR) positions. The rapid increase in Ph.D. enrollments in the past has significantly decreased the likelihood of TA or GSR funding for M.S. students.

12) PELP, In Absentia and Filing Fee status:

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found at the Graduate Studies website: https://grad.ucdavis.edu/current-students/forms-information