

ENVIRONMENTAL SYSTEMS

Ph.D. AND M.S. DEGREE REQUIREMENTS¹

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1. Introduction

1.1 Aims and Scope

The Environmental System (ES) degree program explicitly addresses the interdisciplinary environmental challenges associated with changing climate and resource sustainability in the 21st century. Solutions to these complex problems require integrated research between science and engineering, and implementation using related research in management, economics, and policy. The ES program is intended to circumvent barriers created by traditional academic departments and to foster innovative, transdisciplinary research in environmental and sustainable systems. ES faculty, staff and students are dedicated to excellence in teaching, research, and service, and strive to develop an atmosphere of transparency, equality, diversity, inclusiveness, rigor, integrity, and environmental awareness.

1.2 Admissions Requirements

Applicants must meet the minimum requirements for admission to graduate study at University of California, Merced, described in the Section II of the UC Merced (UCM) Graduate Policies & Procedures (P&P) Handbook, available on the Graduate Division website. All persons seeking admission to graduate standing must submit a formal application for admission using the on-line application system available on the Graduate Division website. Taking the Graduate Examination Record (GRE) exam is optional.

There will be a rolling deadline for receipt of applications as managed by the Admissions Committee. Normally applications will be accepted for Fall semester. Enrollment in other semesters will be considered on an individual basis. Applicants are encouraged to contact individual faculty to discuss their research interests before applying for graduate study. Applicants who identify faculty members who commit to hosting and providing funding may be given priority. Students admitted on Graduate Student Research (GSR) support must be paired with a faculty advisor before admission.

Prospective graduate students should submit the following materials to

<https://graduatedivision.ucmerced.edu/prospective-students/how-apply> :

- The complete official application form;
- The application fee;
- All official university/college/junior college transcripts;
- Three letters of recommendation from instructors or supervisors who can comment on the applicant's scholarly ability and promise as a researcher;
- Official score reports from the Test of English as a Foreign Language (TOEFL) (or IELTS) if the applicant's native language or language of instruction is other than English;
- Current curriculum vitae or resume;
- Statement of purpose highlighting specific research interests and experience;
- Personal history and achievements/contributions.

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- [OPTIONAL] Official GRE score reports from the analytical writing, quantitative reasoning, and verbal reasoning.

Admission decisions are made on a case-by case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility.

1.3 General Committees

- 1 **Executive Committee:** The Executive Committee, in consultation with Group members, will determine and implement policy for the good of the Group, establish and guide the educational requirements of the Group, approve appointments to the Group based on recommendations from the Membership Committee, and represent the interests of the Group to University and other agencies. The Executive Committee shall consist of five elected members: one Executive Committee member plus the Graduate Group Chair and Vice-Chair, Admission Committee Chair, and Education Policy Chair; ex officio members can include the Life & Environmental Sciences (LES) Department Chair and Civil & Environmental Engineering (CEE) Department Chair. The Executive Committee members will serve a term of three years. Committee memberships will be staggered by one year to maintain a range of experience across the committee. Membership may be extended for one year beyond the three-year term by a majority vote of Group members. It is the responsibility of the Executive Committee to prepare an annual slate of nominees to be put before the membership for election to serve on the Executive Committee in subsequent years, assuming one or more members has completed his/her term. The Executive Committee appoints members to the standing committees listed below at the beginning of Fall term. The Executive Committee may choose to not constitute a particular committee as a separate body, in which case the Executive Committee will assume the responsibilities of that committee. Committee formation and appointments will be reviewed on an annual basis.
- 1 **Membership Committee:** The Membership Committee is responsible for reviewing applications from faculty who wish to be part of the Group. The Membership committee will recommend approval or denials for membership to the Executive Committee. This committee will be constituted by at least two Group members appointed by the Executive Committee. The term of service is two years, and appointments are renewable.
- 1 **Education Policy Committee:** The Educational Policy Committee is responsible for establishing and guiding the educational programs of the Group, establishing and maintaining documentation on the ES curriculum, and periodically preparing for system reviews of the ES program, including the five-year review. The Educational Policy Committee, in consultation with Group members, will coordinate and document changes in programmatic requirements of the ES program, and present proposed changes to the voting body. This committee will be constituted by at least two Group members appointed by the Executive Committee, and the Educational Policy Committee Chair will be on the Executive Committee. The term of service will be two years for the regular members, and appointments are renewable.

- 1 **Graduate Advising Committee:** The Advising Committee will match each student with an ES member as an initial graduate advisor, based on student research interests and faculty agreement. The initial graduate advisor, in collaboration with the Advising Committee, will be responsible for advising the student on coursework, fellowship opportunities, research training opportunities and trajectory. It is expected that the initial graduate advisor will meet with advisees at least once per semester. The Advising Committee will be constituted by at least two ES members appointed by the Executive Committee. The term of service is two years, and appointments are renewable.
- 1 **Admissions Committee:** The Admissions committee is charged with the development of recruiting materials for the Group, reviewing applications for admissions, making recommendations for admissions to the Vice Provost and Dean of Graduate Education, exploring graduate student support mechanisms, and allocating intramural financial assistance. This committee will be constituted by at least two Group members appointed by the Executive Committee. The term of service is two years, and appointments are renewable. The Admissions Chair will be on the Executive Committee.

2. Master's Degree Requirements

Students may be admitted to the ES graduate program to work toward an M.S. degree. The recipient of an M.S. degree will possess knowledge of a broad field of learning that extends well beyond that attained at the undergraduate level.

The ES group has established the following requirements for the M.S. degree:

- Each M.S. student is expected to have a faculty advisor at all times during their graduate studies (see Section 2.4.1). As there is considerable amount of freedom in the program, each student is expected to assume responsibility for designing their program in consultation with their advisor. The advisor must approve the final program. The specific requirements are listed below.
- A successful Master's student must complete at least two semesters of full-time academic residence at UCM.

2.1 Degree Plan I Thesis: This plan requires a minimum of 24 semester units in approved courses, at least 20 units must be earned in 200-series graduate-level courses in the major subject. A written thesis and oral examination are required.

- 2.1.1 Program Learning Outcomes (PLOs):** The overarching goal of the ES M.S. program is that its graduates be knowledgeable and professionally competent in one or more areas of environmental systems. The following program learning outcomes are being used to attain this goal. **Core Knowledge** - Graduates will be knowledgeable, skillful and self-directed in the observation and analysis of environments systems in terms of their capacity to design experiments with appropriate controls and conduct original research, with an appropriate level of supervision, in the context of a thesis.

Communication Skills - Graduates will be conversant in at least one area of environmental systems, and be adept at oral, written and visual communication of research results or technical information to peers and non-technical decision makers.

Ethics, Community, and Life-long Learning - Graduates will understand the importance of research and professional ethics, engagement in the needs of their community, and life-long learning.

Career Placement and Advancement - Graduates will find suitable career placement and achieve advancement in government agencies, non-government organizations, private industry, and/or teaching and research institutions.

2.1.2 Course Requirements - Core and Electives (minimum of 24 units):

Students enrolled in M.S. Plan I in ES are required to submit a program of study to their graduate advisor upon joining their research group.

Complete a minimum of 24 semester units in approved courses, at least 20 units must be in 200-series graduate-level courses exclusive of credit given for thesis research and preparation as described below.

Only courses in which the student receives grades of "A+", "A", "A-", "B+", "B", or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "B-" or lower cannot be used to satisfy the unit requirement for the degree but will count in determining the grade point average.

Register for and obtain a satisfactory grade in the program's core course, listed below.

Maintain a cumulative GPA of at least 3.0. Courses graded "S/U" will not be counted in determining grade point averages.

2.1.2.1 Core Courses (total 5 units)

One core course must be completed with a satisfactory grade.

Course Number	Course Name	Units
ES 200	Environmental Systems	3

Additionally, the following is required:

Course Number	Course Name	Units
ES 291	Environmental Systems Seminar (1 unit, taken in 2 different semesters)	2

2 Elective Courses (minimum of 19 units): Electives are selected mainly from ES courses with up to 6 units from other graduate groups or programs and one 4-unit 100-level course. At least 15 units are in 200-series graduate-level courses (i.e., exclusive of credit given for thesis research, ES 295). Electives are chosen with the approval of the graduate advisor.

2.1.2.3 Summary: A minimum of 20 units of graduate coursework (including 3 units of ES 200 and 2 units of ES 291) and up to 4 units of 100-series course are required for a total of 24 units. Electives are chosen with the approval of the graduate advisor. Students must enroll for 12 units per semester including research, academic and seminar units to be eligible for graduate student researcher and academic student employee appointments, and university-administered fellowships. Per UC regulations, ordinarily students shall not receive credits for more than 12 units of graduate-level (200) courses per semester.

2.1.2.4 Transfer of Credits: Though ordinarily all work for the M.S. degree is done in residence, some work taken elsewhere may be credited toward the degree. The normal limit for such transfer work is up to one-fifth the total unit requirement from another institution or up to one-half of the unit requirement from another campus of the University of California, provided the units were not used to satisfy the requirements for another degree. The following policies apply specifically to the transfer of units toward M.S. degree requirements:

- Units of work taken elsewhere than the University of California may not be used to reduce the minimum residence requirement or the minimum requirement in the 200-series courses taken at UCM.
- Petitions for transfer of credit should be submitted within the first semester after enrollment as a UCM graduate student or completion of the academic work for which transfer credit is requested.
- The faculty advisor should make a request to the Graduate Dean specifying the units and courses involved and provide an official transcript for the course(s).

2.1.3 Special Requirements: N/A

2 Advancement to Candidacy: Before advancing to candidacy for the M.S. Plan I degree, a student must have completed a minimum of one semester of full-time residence and at least 12 units of graduate (200-level) courses and must have maintained a minimum GPA of 3.0 in all course work undertaken. Normally, students advance by the end of the third semester. The student must file the appropriate paperwork (Application for Advancement to Candidacy for the Master's Degree and Conflict of Interest Form). Advancement to Candidacy must be filed at least one semester before completion of all degree requirements.

2 Thesis Requirements: In addition to the coursework, completion of the degree requires that students:

- Prepare a written thesis describing relevant research in the field that is read and accepted for defense by the Thesis Committee.

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- Defend the thesis via oral examination, attended and approved by the Thesis Committee.

Thesis committee meetings: The candidate and advisor should meet at least once a year with the other members of the Thesis Committee to discuss progress and any changes in research objectives.

Thesis: Research for the Master's thesis is to be carried out under the supervision of a faculty member of the program and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. The thesis must be submitted to the Thesis Committee at least one month before the scheduled thesis defense (final examination).

The M.S. thesis defense consists of an open seminar on the M.S. work followed by a closed oral examination by the Thesis Committee. No student should appear for this examination until they have been advanced to candidacy by the Dean of Graduate Education. A student must be registered or in current filing fee status when the examination is taken. The date of the examination is arranged between the student and the committee members.

Oral thesis examinations may not be longer than two hours. All members of the Thesis Committee must be in attendance for an oral M.S. final examination (connection via videoconferencing is acceptable). An ES faculty member of the Thesis Committee, who is not the faculty advisor, will be Examination Chair for the thesis defense. The Examination Chair is also responsible for ensuring that assessment materials related to the oral thesis exam are completed by committee members and submitted to assessment staff in a timely fashion.

During the examination, the student is expected to explain the significance of the thesis research, justify the methods employed, and defend the conclusions reached. At the conclusion of the examination, the committee shall vote on whether both the written thesis and the student's performance on the exam are of satisfactory quality to earn a University of California M.S. degree. The committee should strive to reach a unanimous decision.

Possible outcomes are:

- a. Pass:** A student has passed when the Thesis Committee unanimously votes that the student passed the entire examination with scholarship that is at least acceptable. If agreed unanimously by the committee, the student may be allowed to make minor modifications prior to submitting the results of the examination.
- b. Fail:** A student has failed when the Thesis Committee votes unanimously that the student failed the entire examination. The second examination may have a format different from the first, but the substance should remain the same. A student whose performance on the second attempt is also unsatisfactory, or who does not undertake a second examination within a

reasonable time, is subject to academic disqualification.

- c. **Partial pass:** A student has partially passed when the Thesis Committee votes unanimously that the student passed some examination components but failed others. In this instance, the following apply:
 - i. The student has the option of taking a second examination as detailed above on the components failed.
 - ii. A student whose performance on the second attempt is also unsatisfactory, or who does not undertake a second examination within a reasonable time as established by the examination committee, is subject to academic disqualification.

Members of the Thesis Committee may vote to make passing the exam contingent on corrections and/or revisions to the thesis. In this case, the committee will select one member, normally the graduate advisor, who will be responsible for approving the final revision of the thesis prior to its submittal to the Graduate Division.

All committee members must approve the thesis in its entirety and sign the title page before the thesis is submitted electronically to the Graduate Division for final approval. Should the committee determine that the thesis is unacceptable, even with substantial revisions; the program may recommend the student for disqualification from the program to the Vice Provost and Dean of Graduate Education.

If the Thesis Committee cannot reach a unanimous decision concerning a pass, fail, or partial pass, the Examination Chair should determine the areas of disagreement. The Examination Chair must request, and each committee member must write, a detailed assessment of the student's performance for submission to the Vice Provost and Graduate Dean. The committee should only inform the student that the matter was sent to the Vice Provost and Graduate Dean for a final decision. The student has neither passed or failed the exam until the Vice Provost and Graduate Dean decides the results.

The thesis must be submitted by the deadline listed in the Graduate Division website, in the semester in which the degree is to be conferred. Those students who complete requirements and submit thesis after the end of the semester and prior to the start of the subsequent semester will earn a degree for the following semester but will not be required to pay fees for that semester. Instructions on the submission and filing of the thesis are available in the UCM Thesis and Dissertational Manual. A schedule of dates for filing the thesis in final form is published on the Graduate Division website in the [Dates and Deadlines section](#).

2.2 Degree Plan II Non-thesis

This plan requires a minimum of 24 units in approved courses, at least 20 of which must be from graduate-level courses in the 200-series. A comprehensive final examination is required of each candidate. No thesis is required.

2.2.1 Program Learning Outcomes (PLOs):

Core Knowledge - Graduates will be knowledgeable and possess a broad foundation in the fundamentals and current topics of environmental systems, as well as an in-depth understanding of their chosen area of specialization.

Communication Skills - Graduates will be conversant in at least one area of environmental systems, and be adept at oral, written, and visual communication of research results to peers and non-technical decision makers.

Ethics, Community, and Life-long Learning - Graduates will understand the importance of research and professional ethics, engagement in the needs of their community and life-long learning.

Career Placement and Advancement - Graduates will find suitable career placement and achieve advancement in government agencies, non-government organizations, private industry.

2.2.2 Course Requirements - Core and Electives (minimum 24 units):

Students enrolled in M.S. Plan II are required to submit a program of study to their graduate advisor upon enrollment in the program.

Complete a minimum of 24 semester units in approved courses, at least 22 units must be earned in 200-series graduate-level courses.

Only courses in which the student receives grades of "A+", "A", "A-", "B+", "B", or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "B-" or lower cannot be used to satisfy the unit requirement for the degree but will count in determining the grade point average.

Register for and obtain a satisfactory grade in the program's core course, listed below.

Maintain a cumulative GPA of at least 3.0. Courses graded "S/U" will not be counted in determining grade point averages.

2.2.2.1 Core & Required Courses (total 5 units)

One core course must be completed.

Course Number	Course Name	Units
ES 200	Environmental Systems	3

Additionally, the following is required:

Course Number	Course Name	Units
ES 291	Environmental Systems Seminar (1 unit, taken in 2 different semesters)	2

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2.2.2.2 Elective Courses (total 19 units): Electives are selected mainly from ES courses with up to 6 units from other graduate groups or programs and up to one 4-unit 100-level course. At least 15 units are in 200-series graduate-level courses (including ES 299; excluding ES 295). Electives are chosen with the approval of the graduate advisor.

2.2.2.3 Summary: A minimum of 20 units of graduate coursework (including 3 units of ES 200 and 2 units of ES 291) and up to 4 units of 100-series course are required for a total of 24 units. Electives are chosen with the approval of the graduate advisor. Page 12

2.2.2.4 Transfer of Credits: Same as MS Plan I Thesis.

2.2.3 Special Requirements: N/A

2 Advancement to Candidacy: Before advancing to candidacy for the M.S. Plan II degree, a student must have completed a minimum of one semester of full-time residence and at least 9 units of graduate (200-level) courses and must have maintained a minimum GPA of 3.0 in all course work undertaken. Normally, students advance by the end of the first semester. The student must file the appropriate paperwork (Application for Advancement to Candidacy for the Master's Degree). Advancement to candidacy must be filed prior to the beginning of the final semester of enrollment.

2.2.5 Comprehensive Examination:

The M.S. comprehensive examination is a written and/or oral test that assesses understanding of the fundamentals of environmental systems. The content of the exam represents a capstone requirement that integrates the intellectual substance of the program.

2 Timing: The comprehensive examination should be taken by students who have completed their Plan II course requirements. No student should appear for this examination until after they have been advanced to candidacy. The exam is administered each year at the end of spring semester. Students, who need to take the exam at a different time for extenuating circumstances, should contact the Graduate Group Chair to make arrangements. Students must be registered or in current filing fee status at the time when they take the examination.

2 Examination: The M.S. comprehensive examination is 3-hour oral and/or written test that assesses general preparedness in the discipline. In the case of the end-of the year written exam, students must respond to 4 questions, each addressing material covered in graduate courses in ES at UCM. Reference material (texts, reference books, notes, etc.) are not permitted. Calculators and computers may be permitted if the examination committee deems them necessary. The exam will be prepared by three members of the ES faculty (Comprehensive Examination Committee) who will jointly

determine the form and content of the exam and will request questions from faculty who teach ES courses that year.

- 2 **Outcome:** Examinations can result in either a pass or fail. If a student does not pass the examination, they may be reexamined. The examination may not be repeated more than once. A student whose performance on the second attempt is also unsatisfactory, or who does not undertake a second examination within a reasonable time as established by the examination committee, is thereby subject to disqualification from further work as a graduate student in this program.

2.3 Degree Plan Professional Masters (N/A)

2.4 Advising Structure and Mentoring

- 2.4.1 Advising Structure:** Students will be assigned an initial graduate advisor (who can be the Graduate Group Chair) when they first enroll unless the student already has a graduate advisor approved by the Graduate Group Chair. Students admitted on Graduate Student Research (GSR) support must be paired with a faculty advisor before admission. All M.S. Plan I and II students in the ES Graduate Group must have a graduate advisor of their choice approved by the Graduate Group Chair by the end of their first semester. The graduate advisor must be a member of the ES Graduate Group. If the advisor is a non-Senate faculty member of the ES Graduate Group, they must be approved by the Vice Provost and Graduate Dean. The heart of the ES graduate program for M.S. Plan I students is the completion of a piece of original scientific research leading to the preparation and defense of a thesis. To this end, each student should discuss research interests and possible projects with faculty in the group as early as possible and select a graduate advisor early during the first year of study, preferably by the end of the first semester. Selection of a graduate advisor must be approved by the Graduate Group Chair and must occur before the student's Thesis Committee can be constituted (see Section 2.5). The student and the graduate advisor together will develop a research topic, and research will normally occupy most of the student's time after the first year of residence. Interdisciplinary projects are highly encouraged, as are research collaborations with faculty or senior scientists outside UCM. The goal of the M.S. Plan II is for students to gain technical competency in environmental systems through taking courses and passing the Comprehensive Examination. To that end, the student needs a graduate advisor from the first semester and to lay out a course of study. Students need Graduate Group Chair permission to switch between Plan I and Plan II M.S. degree programs. The graduate advisor is the faculty member who approves the student's plan of study and supervises the student's research and thesis. The Graduate Group Chair, who is appointed by the Vice Provost and Dean of Graduate Education, is a resource for information on academic requirements, policies and procedures, and registration information until the student's Degree Committee is formed (see Section 2.5). The

Graduate Group Coordinator assists students with identifying appointments and general university policies.

2.4.2 Evaluation of Student Progress

After their first year of graduate study, M.S. Plan I students and Plan II students who have not passed their comprehensive exams must schedule annual reviews with their Degree Committees (see section 2.5), during which they evaluate the progress made during the prior year, discuss any areas that need improvement, identify upcoming milestones towards the degree objective, and outline plans for specific research or course objectives in the next year. It is the student's responsibility to submit the completed annual review form to the graduate support staff for proper filing of the document.

Graduate students are expected to maintain satisfactory progress as defined by the faculty of the program, and in accordance with the Policies and Procedures for the student's Graduate Group, and policies of the Graduate Council and UCM.

Satisfactory progress is determined based on both the student's recent academic record and overall performance. A graduate student who has not demonstrated satisfactory academic progress may be subject to academic disqualification. Further details regarding definitions of satisfactory progress, unsatisfactory progress, and grounds and procedures for academic disqualification may be found in the UCM Graduate P&P Handbook (Section VI).

Summarizing, satisfactory progress is defined as:

1. Graduate students must maintain at least a 3.0 grade-point average to be considered in good academic standing, advance to candidacy or to be awarded an academic graduate degree.
 - Only courses in the 100 and 200 series in which the student receives grades of "B" or higher, or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "B-" or lower cannot be used to satisfy the unit requirement for the degree but will count in determining the grade point average.
 - Courses graded "S/U" are not counted in determining grade point averages.
2. Students are expected to have a faculty advisor at all times during their graduate studies (approved advisors must be selected by the end of their first semester (Plan I) or first year of study (Plan II)). Students are responsible for an orderly transition to a subsequent adviser, if required, which often involves the Graduate Group Chair stepping in as an interim advisor.
3. Students must make satisfactory progress in their program of study as determined by their graduate advisor.

2.5 Degree Committees

Once the Plan I M.S. student selects their faculty advisor, they, in consultation with the advisor and program faculty, and with approval by the Graduate Group Chair, form a degree committee: Thesis Committee. For Plan II M.S. students, the Graduate Chair will

form a Comprehensive Examination Committee. The role of the degree committee is to advise on and supervise the student's choice of courses and thesis research (Plan I) or choice of courses (Plan II), pass on the content of the thesis (Plan I), and administer the general examination.

Reconstitution of the committee may be justified by a substantial change in the student's thesis topic or may be required by the departure of a committee member from the University. Also, if a committee member's absence from campus for an extended period makes scheduling of examinations unreasonably difficult, the student may request that the committee be reconstituted. When membership changes must be made, the faculty advisor in consultation with the student should recommend a new committee member, giving the reason for the change. The change must be reviewed and approved by the Graduate Group Chair and the Vice Provost and Dean of Graduate Education.

2.5.1 Thesis Committee (Plan I)

The student, in consultation with their graduate advisor, nominates a minimum of three voting members of the University of California Academic Senate or the equivalent to serve on the Thesis Committee. Of the three, one is the student's graduate advisor (Thesis Committee Chair). The majority of the committee must be members of the ES Graduate Group (one of whom is appointed as Examination Chair). Committee members may be non-academic senate faculty on an exception-only basis: Professional Researchers, adjunct faculty from any UC campus, or an individual from outside the University of California who has special expertise and qualifications.

As per University policy, the graduate advisor may nominate non-academic senate faculty members on the committee in lieu of a UC academic senate faculty. The nomination should include: (i) a brief statement indicating the appointee's affiliation and title and how the prospective appointee has special expertise or qualifications; (ii) a current curriculum vitae and (iii) a letter or email from the proposed appointee indicating a willingness to serve to the Graduate Group Chair. These nominations are submitted to the Graduate Division for formal appointment in accordance with Graduate Council policy two weeks prior to the examination.

All members of the committee must be in attendance (either in person or remotely) for the M.S. oral thesis exam.

2.5.2 Comprehensive Examination Committee (Plan II)

The Graduate Group Chair nominates three voting members of the University of California Academic Senate or the equivalent to serve on a Comprehensive Examination Committee, at least two are ES Graduate Group members (one of whom is appointed as Examination Committee Chair).

This Comprehensive Examination Committee shall approve the subject, pass on the content of examination, and administer the examination.

2.5.3 Other (N/A)

2.6 Normative Time to Degree

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Nominally, a student advances to candidacy and completes the Master's Degree Plan I within 2 years and Plan II within 1 year. Extensions beyond these limits can be permitted by the Education Policy Committee.

2.7 Typical Timeline and Sequence of Events

The goals and needs of individual students vary considerably, and no single plan will accommodate all students. Therefore, the following programs of study should be considered as a general guide only.

The general timeline for Master's Degree Plan I:

Year/Semester	Activities
Year 1 (Semesters 1,2)	Learn about research
	Take classes
Summer 1	Begin full time research with faculty advisor
Year 2 (Semesters 3,4)	Continue full time research with faculty advisor
	Take classes
	Assemble faculty committee
	Prepare manuscript(s) for publication
	Present work at scientific conference; network for career
	Defend and publish thesis

An example Master's Degree Plan I:

<i>Year 1</i>	<i>Fall</i>	<i>Spring</i>
	<i>ES 200 – Environmental Systems (3)</i>	<i>ES 291 – ES Seminar (1, S/U)</i>
	<i>ES 291 – ES Seminar (1, S/U)</i>	<i>ES 2XX -- Graduate elective (4)</i>
	<i>ES 2XX -- Graduate elective (3)</i>	<i>ES 2XX -- Graduate elective (3)</i>
	<i>ES 2XX -- Graduate elective (4)</i>	<i>ES 295 – Graduate Research (4, S/U)</i>
	<i>ES 295 – Graduate Research (1, S/U)</i>	
<i>Year 2</i>	<i>Fall (Advancement to Candidacy)</i>	<i>Spring (Thesis completed)</i>
	<i>ES 2XX -- Graduate elective (3)</i>	<i>ES 295 – Graduate Research (12, S/U)</i>
	<i>ES 295 – Graduate Research (9, S/U)</i>	<i>Complete M.S. Thesis and Pass Oral</i>

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		<i>Thesis Defense</i>
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The general timeline for Master's Degree Plan II:

Year/Semester	Activities
<i>Year 1 (Semester 1)</i>	Take classes and advance to Candidacy
<i>Year 1 (Semester 2)</i>	Finish coursework and pass Comprehensive Exam

An example Master's Degree Plan II:

Year 1	Fall (Advancement to Candidacy)	Spring
	<i>ES 200 – Environmental Systems (3)</i>	<i>ES 291 – ES Seminar (1, S/U)</i>
	<i>ES 291 – ES Seminar (1, S/U)</i>	<i>ES 2XX -- Graduate elective (3)</i>
	<i>ES 2XX -- Graduate elective (3)</i>	<i>ES 2XX -- Graduate elective (3)</i>
	<i>ES 2XX -- Graduate elective (3)</i>	<i>ES 2XX -- Graduate elective (3)</i>
	<i>ES 299 – Independent study (2, S/U)</i>	<i>ES 299 – Independent study (2, S/U)</i>
		<i>Pass Comprehensive Exam</i>

2.8 Sources of Funding

Graduate students who received a funding offer with their admissions offer will have their financial support according to the terms of the funding offer. Funding will come through a combination of Teaching Assistantships, Graduate Research Assistantships, and/or Fellowships. Master's students are typically not expected to be funded by such means; but they may receive a funding offer with their admissions offer. More information on financial support can be found in the [Graduate Policies and Procedures Handbook](#).

3. Doctoral Degree Requirements

The Doctor of Philosophy degree is granted to students who demonstrate a thorough knowledge of a broad field of learning and have given evidence of distinguished accomplishment in that field. The degree also signifies that the recipient has critical ability and powers of imaginative synthesis as demonstrated by a doctoral dissertation containing an original contribution to knowledge in his or her chosen field of study.

In addition to the course and other requirements listed below, Ph.D. students must

- Complete at least four semesters of full-time academic residence at UCM.
- Complete at least 12 units of ES 295: Graduate Research.

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- Give two public oral presentations on their research: either on campus or at a professional conference. Page 18
- Present a written dissertation project proposal for approval and pass an oral Qualifying Examination before the end of year 2, administered by the Candidacy Committee.
- Advance to Candidacy before the end of year 3, approved by Doctoral Committee.
- Present a doctoral dissertation containing an original contribution to knowledge in the field for approval, and successfully defend it during a final oral examination, administered by the Doctoral Committee.

Students, who have not previously earned a Master's degree in environmental systems or similar discipline, whose degree objective is a Ph.D. but who wish to also receive an M.S. from UCM, known as a "Master's along the way" option, must complete all requirements for an M.S. degree, either Plan I or II. See section 3.15.

Courses taken toward a graduate degree at another institution cannot be transferred for credit toward a Ph.D. at UCM. However, a course requirement may be waived if a similar course was taken at another institution and the instructor and Graduate Group Chair determine that the student exhibits adequate knowledge and understanding of the relevant material. Up to 12 units of 200-level graduate courses can be waived if deemed appropriate. The General Petition form should be used for all requests for waivers of course work. To obtain a waiver, the student should submit a full description of the course, including a syllabus and a confirmation it is a graduate course and a copy of the student's transcripts, along with the Petition to Graduate Group for review, who will then submit it to the Graduate Division for review and approval (see UCM Graduate P&P Handbook, Section VII.B.4).

3.1 Program Learning Outcomes (PLOs)

The overarching goal of the ES Ph.D. program is that its graduates be knowledgeable and professionally competent in one or more areas of environmental systems. The following program learning outcomes are being used to attain this goal.

Core Knowledge - Graduates will be knowledgeable, skillful, and self-directed in the observation and analysis of environmental systems in terms of their capacity to independently identify important research questions, develop experimental plans, analyze data, and formulate conclusions in the context of a doctoral dissertation.

Communication Skills - Graduates will be conversant in at least two areas of environmental systems, and be adept at oral, written, and visual communication of research results to peers and non-technical decision makers.

Ethics, Community, and Life-long Learning - Graduates will understand the importance of research and professional ethics, engagement in the needs of their community, and life-long learning.

Career Placement and Advancement - Graduates will find suitable career placement and achieve advancement in government agencies, non-government organizations, private industry, and/or teaching and research institutions.

3.2 Course Requirements - Core and Electives:

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Graduate students in ES are required to submit a program of study to the Graduate Group Advisor upon enrollment in the program. As there is considerable amount of freedom in the program, each student is expected to assume responsibility for designing his/her program. A student is expected to develop graduate level competency in their specific area of research as well as environmental systems.

Specifically, Ph.D. students must:

- Complete a minimum of 24 semester units in approved courses, at least 20 of which must be earned in 200-series graduate-level courses exclusive of credit given for thesis research and preparation as described below.
- Receive a grade of "A+", "A", "A-", "B+", or "B", or "S" for all of the 24 units of approved courses. A course in which a student receives a "B-" or lower cannot be used to satisfy the unit requirement for the degree but will count in determining the grade point average. Page 19
- Maintain a cumulative GPA of at least 3.0. Courses graded "S/U" will not be counted in determining grade point averages.

3.2.1 Core & Required Courses (total 5 units)

One core course must be completed with a satisfactory grade.

Course Number	Course Name	Units
ES 200	Environmental Systems	3

Additionally, the following are required:

Course Number	Course Name	Units
ES 291	Environmental Systems Seminar (1 unit, taken in 2 different semesters)	2

3.2.2 Elective Courses (minimum of 19 units without an approved M.S. degree and less with substitute units from an approved M.S. degree)

For students without a prior graduate degree (see Section 3. Doctoral Degree Requirements), electives are selected mainly from ES courses with up to 6 units from other graduate groups or programs and one 4-unit 100-level course. At least 15 units are in 200-series graduate-level courses (exclusive of credit given for dissertation research ES 295).

For students whose research is multidisciplinary and require more than 6-units of courses from other graduate groups need to submit a General Petition to the Graduate Group.

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For students with a prior graduate degree, the number of the required units of graduate-level elective courses will decrease depending on the number of waived units of graduate-level courses (see Section 3. Doctoral Degree Requirements)

Electives are chosen with the approval of the graduate advisor.

- 3 **Summary:** A minimum of 20 units of graduate coursework (including 3 units of ES 200 and 2 units of ES 219) and up to 4 units of 100-series course. Interested students can peruse one of four concentrations as detailed above. Students without a prior M.S. degree or who have not previously earned a Master's degree in environmental systems or similar discipline wanting an additional M.S. degree, have the option to get a "Masters along the way." Electives are chosen with the approval of the graduate advisor. Students must enroll for 12 units per semester including research, academic and seminar units to be eligible for graduate student researcher and academic student employee appointments, and university-administered fellowships. Per UC regulations, ordinarily students shall not receive credits for more than 12 units of graduate-level (200) courses per semester.

3.3 Special Requirements

None

3.4 Dissertation Plan

In accordance with University of California policy, a minimum of four semesters in academic residence is required prior to awarding the Ph.D. Typically, a longer period of study, four to six years, is required for completion of all degree requirements. For the purposes of determining residency, only the Fall and Spring semester will be counted; however, the summer semester may be counted in evaluating students on academic probation. All graduate students are considered resident graduates not candidates for a degree, unless admitted to candidacy after completion of all candidacy requirements and approval by the Graduate Division after formal application. A student advances to candidacy for the Ph.D. upon successfully demonstrating a high level of scholarship at the Ph.D. level, and upon completing all preparatory work and demonstrating readiness to proceed to the dissertation phase. Advancement to candidacy must occur no later than the sixth semester of residence in the Ph.D. program. Section 3.9 provides more detailed information on the dissertation phase.

3.5 Advising Structure and Mentoring

3.5.1 Advising Structure

Students will be assigned an initial graduate advisor when they first enroll, unless the student already has a graduate advisor approved by the Graduate Group Chair. Ph.D. students in the ES Graduate Group are expected to always have a faculty advisor during their graduate studies (or advisors, due to the multidisciplinary nature of ES). Students should have their advisor(s) of choice approved by the Graduate Group Chair by the end of their first year. All subsequent references to advisor imply advisors in the case of co-advisors (same for their roles, e.g., Doctoral Committee Chairs). The graduate advisor must be a member of the ES Graduate

Group. If the advisor is a non-Senate faculty member of the ES Graduate Group, they must be approved by the Vice Provost and Graduate Dean.

The heart of the ES graduate program for Ph.D. students is the completion of a piece of original scientific research leading to the preparation and defense of a dissertation. To this end, each student should discuss research interests and possible projects with faculty in the group as early as possible and select a graduate advisor early during the first year of study, preferably by the end of the first semester. Selection of a graduate advisor must be approved by the Graduate Group Chair and must occur before the student's Degree Committee can be constituted (see Section 3.6). The student and the graduate advisor together will develop a research topic, and research will normally occupy a majority of the student's time after the first year of residence. Interdisciplinary projects are highly encouraged, as are research collaborations with faculty or senior scientists outside UCM.

The Graduate Advisor is the faculty member who approves the student's plan of study and supervises the student's research and dissertation. The Graduate Group Chair, who is appointed by the Vice Provost and Dean of Graduate Education, is a resource for information on academic requirements, policies and procedures, and registration information until the Doctoral Committee is formed. The Graduate Group Coordinator assists students with identifying appointments and general university policies.

3.5.2 Evaluation of Student Progress

After their first year of graduate study, Ph.D. students must schedule annual reviews with their graduate advisor and their Degree Committee, if the committee has been formed (see section 3.6), during which they evaluate the progress made during the prior year, discuss any areas that need improvement, identify upcoming milestones towards the degree objective, and outline plans for specific research or course objectives (respectively) in the next year. It is the student's responsibility to submit the completed annual review form to the graduate support staff for proper filing of the document.

Graduate students are expected to maintain satisfactory progress as defined by the faculty of the program, and in accordance with the Policies and Procedures for the student's Graduate Group, and policies of the Graduate Council and UCM.

Satisfactory progress is determined based on both the student's recent academic record and overall performance. A graduate student who has not demonstrated satisfactory academic progress may be subject to academic disqualification. Further details regarding definitions of satisfactory progress, unsatisfactory progress, and grounds and procedures for academic disqualification may be found in the UCM Graduate P&P Handbook (see Section VI).

Summarizing, satisfactory progress is defined as:

1. Students must maintain at least a 3.0 cumulative grade point average in all upper division and graduate courses elected during their residence as graduate students at the University of California:

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- Graduate students must maintain at least a 3.0 grade-point average to be considered in good academic standing, advance to candidacy or to be awarded an academic graduate degree. Page 22
- Only courses in the 100 and 200 series in which the student receives grades of "B" or higher, or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "B-" or lower cannot be used to satisfy the unit requirement for the degree but will count in determining the grade point average.
- Courses graded "S/U" are not counted in determining grade point averages.

Student must have a graduate advisor(s) of their choice and approved by the Graduate Group Chair (selected by the end of their first year of study and, if required, an orderly transition to a subsequent adviser).

Students must make satisfactory progress in their program of study as determined by their graduate advisor.

For students deemed not making satisfactory progress, they will then be allowed a maximum of two semesters to make up the deficiencies and be returned to good academic standing. Otherwise, the student will be dismissed from the graduate program.

3.6 Degree Committees

Ph.D. students have two degree committees: the Candidacy Committee and the Doctoral Committee. Graduate students are nominated for admission to candidacy for the Ph.D. degree by the Graduate Group. Students are admitted to candidacy if they pass by unanimous vote a qualifying examination administered by a Candidacy Committee and meet all other conditions (see Section 3.7). The Doctoral Committee shall supervise the preparation and completion of the dissertation and final exam. The composition of the Candidacy and Doctoral Committees can be the same.

The Degree Committee(s) typically consists of a minimum of four members, although additional committee members are permitted if warranted by the student's research project. The majority of voting members must hold appointments in ES. One member is the student's graduate advisor (Doctoral Committee Chair), one member should be a Senate faculty member who holds a core membership outside the ES group, and the rest are typically ES faculty members. A non-Senate ES faculty member must be approved by the Vice Provost and Graduate Dean. Under some circumstances one of the committee members can be a Senate faculty member from any UC campus or an individual from outside the University of California who has special expertise and qualifications. In this case, the graduate advisor should submit: (i) a brief statement indicating the appointee's affiliation and title and how the prospective appointee has special expertise or qualifications that are not represented on the campus; (ii) a current curriculum vitae and (iii) a letter or email from the proposed appointee indicating a willingness to serve to the Graduate Group Chair and then the Vice Provost and Dean of Graduate Education for review and approval two weeks before the exam.

All members of the committee must be in attendance (either in person or remotely) for the Ph.D. oral Qualifying Examination and dissertation defense. If a committee member's absence from campus for an extended period makes scheduling of examinations unreasonably difficult, the student may request that the committee be reconstituted. Reconstitution of the committee may also be justified by a substantial change in the student's thesis topic or may be required by the departure of a committee member from the university. When membership changes must be made, the graduate advisor in consultation with the student should recommend a new committee member, giving the reason for the change. The change must be reviewed and approved by the Graduate Group Chair and the Vice Provost and Dean of Graduate Education.

3.6.1 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 committee structure is described above.

The student, in consultation with her/his graduate advisor, nominates a minimum of four faculty to serve on the Candidacy Committee (an ES member, not the graduate advisor, will be appointed committee chair). These nominations are submitted to the Graduate Group Chair for formal appointment in accordance with Graduate Council policy. The Application for Qualifying Examination available on the Graduate Division website must be submitted at least one month prior to the proposed examination date. Students must be in good academic standing and registered for the semester in which the examination is held. The Candidacy Committee conducts the exam and submits results to the Graduate Division using the Qualifying Examination Report Form.

The graduate advisor's primary role during all committee meetings is to add depth to the review. The committee should work as a team to assess the student's progress, challenging the student to answer difficult questions without being confrontational. The graduate advisor is encouraged to ask probing questions, but the purpose of the committee meetings is to establish the competency level of the student, so if the graduate advisor answers questions on behalf of the student, this must be viewed as a competency deficiency on the part of the student.

3.6.2 Doctoral Committee

The Doctoral Committee shall supervise the preparation and completion of the dissertation and the final defense. The Doctoral Committee is, at minimum, a four-member committee nominated by the student in consultation with the Doctoral Committee Chair (the graduate advisor). These nominations are submitted to the Graduate Group Chair for formal appointment in accordance with Graduate Council policy and is specified on the Advancement to Candidacy for the Degree of Doctor of Philosophy Form. For the dissertation defense, the chair of the examination shall be an ES member of the Doctoral Committee who is not the graduate advisor. The role of the Doctoral Committee is to advise the doctoral student on the research topic and methods, and then to review the final completed dissertation for acceptance. The

Doctoral Committee Chair should determine the desires of the individual members regarding assistance with the research and dissertation review at the time the Doctoral Committee is constituted. Students are expected to meet with the Doctoral Committee Chair regularly. Doctoral committee members are expected to read and comment on a dissertation within four weeks from its submission. The student and faculty will coordinate a timeline for the student to present the thesis to the Doctoral Committee. This timeline must allow all Doctoral Committee members enough time to fulfill their responsibilities within the indicated deadline.

3.7 Advancement to Candidacy

All graduate students are considered resident graduates, not candidates for a degree, unless admitted to candidacy by the Graduate Division after formal application. Before advancing to candidacy for a doctoral degree, a student must have satisfied all requirements set by the graduate program, must have maintained a minimum GPA of 3.0 in all course work undertaken, must have passed unanimously the Qualifying Examination before the Candidacy Committee appointed to administer that examination. Upon successful completion of that examination (including the dissertation project proposal and oral Qualifying Examination), the student will fill out and apply for advancement to candidacy. At the time of advancement to candidacy, Ph.D. students in the Environmental Systems Ph.D. program who have not previously earned a master's degree in Environmental Systems or similar discipline may obtain a master's degree while working toward the Ph.D. degree. Students must get the approval of their faculty advisor (see section 3.15). After the application is signed by the graduate advisor, the student pays a candidacy fee and submits the form to the Graduate Division for review and approval. The candidate and graduate program will be notified of formal advancement and the appointment of a Doctoral Committee. Advancement to Candidacy begins with the first academic term following completion of all requirements (including submission of all forms). Upon advancement to candidacy for the degree, the Doctoral Committee is then charged to guide the student in research and in the preparation of the dissertation. Advancement to candidacy must occur no later than the sixth semester of residence in the ES program.

3.8 Qualifying Examination Requirements

3.8.1 Qualifying Examination

i. General Information

All students in the ES Ph.D. program are required to pass an oral qualifying examination before advancement to candidacy for the Ph.D. degree. The Qualifying Examination is normally taken after completion of most of formal coursework, but no later than before the end of the fourth semester in residence, unless the student successfully petitions for a later date. The student must be registered in the semester of the examination. The Qualifying Examination may not be longer than three hours.

The Qualifying Examination should evaluate both general preparedness in the discipline, and specific competence to pursue the proposed dissertation topic. In its deliberation, the Candidacy Committee ordinarily will review the student's academic

record and faculty evaluations. The Candidacy Committee may conduct any other examination it deems appropriate. The Candidacy Committee ordinarily will review a research proposal and will determine by oral examination the student's competence.

The oral examination will include two parts: a presentation of the proposed dissertation research and structured oral examination on graduate course materials and topics related to the proposed research, both of which allow the committee to assess the candidate's competence to pursue their proposed research.

ii. Research Proposal

The research proposal topic must be approved by the members of the student's Candidacy Committee. The student must meet with his/her Candidacy Committee not less than six weeks in advance of the Qualifying Examination for approval of the research proposal topic. Prior to this meeting, the student will submit a draft title of the research proposal to the committee members, which will be discussed at the meeting with the student and modified as the committee sees fit. Following the meeting, it is the student's responsibility to develop a clear, concise written research proposal on the topic approved by the committee.

The Candidacy Committee expects the student to identify a valid scientific problem of intrinsic value to the scientific community and to develop a research plan to study the problem and to identify what will be learned. The research proposal may take the form of theoretical developments, computations, field and/or laboratory studies, the exploration of a new technique, or combinations of approaches. Inclusion of preliminary results is appropriate.

The student will submit his/her finished research proposal (ten pages) to the Candidacy Committee not less than two weeks before the oral examination date.

iii. Outcome of the Exam

Before voting upon its recommendation for or against candidacy, the Candidacy Committee, as a whole, shall meet with the student, and any member of the committee will have the right to pose appropriate questions to the student. The committee must conclude its examination when convened with the student present. The committee, having reached a unanimous decision, shall inform the student of its decision to:

- Pass- A student has passed when the Candidacy Committee unanimously votes that the student passed the entire examination with scholarship that is at least acceptable. The committee must report to the Graduate Council via the Vice Provost and Dean of Graduate Education within 30 days. If agreed unanimously by the committee the student may be allowed to make minor modifications prior to submitting the results of the examination.
- Fail- A student has failed when the Candidacy Committee votes unanimously that the student failed the entire examination. The second examination may have a format different from the first, but the substance should remain the same. A student whose performance on the second attempt is also unsatisfactory, or who

does not undertake a second examination within a reasonable time, is subject to academic disqualification.

- Partial Pass- A student has partially passed when the Candidacy Committee votes unanimously that the student passed some components but failed others. In this instance, the following apply:
 - The student has the option of taking a second examination as detailed in above on the components failed; and
 - The chair of the committee must write a letter to the student, with a copy to the Graduate Division, conveying the information about the student's performance (pass, fail, or partial pass) on each of the components covered during the examination.

If a unanimous decision takes the form of "Partial Pass" or "Fail", the Chair of the Candidacy 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.

If the Candidacy Committee cannot reach a unanimous decision concerning a pass, fail, or partial pass, the chair should determine the areas of disagreement. The committee chair must request, and each committee member must write, a detailed assessment of the student's performance for submission to the Vice Provost and Graduate Dean. The committee should only inform the student that the matter was sent to the Vice Provost and Graduate Dean for a final decision. The student has neither passed or failed the exam until the Vice Provost and Graduate Dean decides the results.

The committee must send the formal Report, signed by all the committee members to the Vice Provost and Graduate Dean. The exam chair is also responsible for ensuring that assessment materials related to the Qualifying Examination are completed by committee members and submitted to assessment staff in a timely fashion.

A student who has failed the examination may repeat the Qualifying Examination after a preparation time of at least three months. The examination must be held by the same committee, although committee members may be replaced, with the approval of the faculty advisor, for cause such as extended absence from the campus. Failure to pass the examination on the second attempt means that the student is subject to disqualification from further study for the doctoral degree. After a second examination, only Pass or Fail is recognized by the Vice Provost and Dean of Graduate Education.

3.9 Dissertation Requirements

The Ph.D. dissertation must be creative and independent work that can stand the test of peer review. The expectation is that the material will serve as the basis for publication(s) in a peer-reviewed journal. The work must be the student's, and it must be original and defensible. The student is encouraged to discuss with members of the Doctoral Committee

both the substance and the preparation of the dissertation well in advance of the planned date of dissertation defense.

The student must provide a copy of the dissertation to each member of the degree committee and allow each committee member at least three weeks to read and comment on it before scheduling the date of the dissertation defense. If one or more Doctoral Committee members believe 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 scheduling the defense. Once the committee members agree that the dissertation is ready to be defended (although minor errors or matters of controversy may still exist), the final examination date may be scheduled by the student in consultation with the committee. Final examinations may not be longer than three hours. The date must be reported to the Vice Provost and Dean of Graduate Education, and one copy of the dissertation filed, no later than three weeks before the proposed date of the final examination.

3.9.1 Final Exam

The Ph.D. final examination (dissertation defense) consists of an open seminar on the dissertation work followed by a closed examination by the Doctoral Committee facilitated by the exam chair. During the examination, the student is expected to explain the significance of the dissertation research, justify the methods employed, and defend the conclusions reached. At the conclusion of the examination, the committee shall vote on whether both the written dissertation and the student's performance on the exam are of satisfactory quality to earn a Ph.D. degree from the University of California. Unanimous consensus is required for a pass. Members of the committee may 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 faculty advisor, who will be responsible for approving the final revision of the dissertation prior to its submittal to Division of Graduate Studies. All members of the degree committee must sign the final dissertation. The exam chair is also responsible for ensuring that assessment materials related to the final exam are completed by committee members and submitted to assessment staff in a timely fashion.

3.9.2 General Requirements

The submission of the dissertation is the last step in the program leading to the award of an advanced degree. All dissertations submitted in fulfillment of requirements for advanced degrees at UCM must conform to certain University regulations and specifications regarding format and method of preparation. The UCM Thesis and Dissertation Manual are available at the Graduate Division website. The Doctoral Committee certifies that the completed dissertation is satisfactory through the signatures of all committee members on the signature page of the completed dissertation. The Doctoral Committee chair is responsible for the content and final presentation of the manuscript.

Filing instructions are found in the UCM Thesis and Dissertation Manual. The advanced degree manuscript is expected to be submitted by the deadline in the

semester in which the degree is to be conferred. The end of the semester is the deadline for submitting dissertations during each semester. Those students who complete requirements and submit dissertations after the end of the semester and prior to the start of the subsequent semester will earn a degree for the following semester but will not be required to pay fees for that semester. In accordance with UC and UCM policy, all approved thesis/dissertation manuscripts automatically become available for public access and circulation as part of the UC Libraries collections.

3.9.3 Dissertation

The research conducted by the student must be of such character as to show ability to pursue independent research. The dissertation reports a scholarly piece of work of publishable quality that solves a significant scientific problem in the field and is carried out under the supervision of a member of the program while the student is enrolled in the program. The chair of the Doctoral Committee must be a member of the program and must be involved with the planning and execution of the dissertation research.

Students should meet regularly with their Doctoral Committee. The dissertation must be submitted to each member of the committee at least one month before the student expects to make the defense. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback. The dissertation must be approved and signed by the Doctoral Committee before it is submitted to Graduate Division for final approval.

3.10 Normative Time to Degree

Normative Time to Advancement to Candidacy in ES is four semesters for students who pursue the Ph.D. directly after the bachelor's degree. Normative Time in Candidacy, which are the remaining semesters recommended for completion of the dissertation, is six semesters. Normative time for completion of the Ph.D. degree for a student entering the program with an M.S. degree in a relevant field is 4 years.

3.11 Typical Timeline and Sequence of Events

The general Timeline for Ph.D. Degree plan:

<i>Year/Semester</i>	<i>Activities</i>
Year 1 (Semesters 1,2)	Learn about research
	Take classes
Summer 1	Begin full time research with Ph.D. advisor
Year Two (Semesters 3,4)	Continue full time research with Ph.D. advisor
	Take one class per semester if necessary
	Assemble Candidacy Committee (beginning 3 rd semester)

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	Prepare for qualifying exam
	Schedule qualifying exam (4 th semester) – defend Ph.D. research proposal and advance to candidacy
Year Three (Semesters 5,6)	Assemble Doctoral Committee, which can be same as Candidacy Committee
	Conduct research
	Prepare manuscripts for publication
	Present work at scientific conference; network for career
	Apply for candidacy after passing qualifying exam & completing all coursework
Year Four (Semesters 7,8)	Conduct research
	Continue preparing manuscripts for publication
	Present work at scientific conference; network for career
Year Five (Semesters 9,10)	Conduct research
	Present work at scientific conference; network for career; publish
	Declare candidacy for graduation (ninth semester)
	Defend and publish dissertation (tenth semester)

An example Ph.D. Degree plan:

<i>Year One</i>	<i>Fall</i>	<i>Spring</i>
	ES 200 Environmental Systems (3)	ES 2XX: Technical Elective (4)
	ES 2XX: Technical Elective (4)	ES 2XX: Technical Elective (4)
	ES 2XX: Technical Elective (4)	ES 2XX: Technical Elective (4)
	ES 291: Research Seminar Series (1)	

<i>Year Two</i>	<i>Fall</i>	<i>Spring</i> (<i>advancement to Ph.D. candidacy</i>)
	ES 2XX: Technical Elective (4)	ES 295: Graduate Research (12)
	ES 291: Research Seminar Series (1)	
	ES 295: Graduate Research (7)	
<i>Year Three</i>	<i>Fall</i>	<i>Spring</i>
	ES 295: Graduate Research (12)	ES 295: Graduate Research (12)
<i>Year Four-Five</i>	<i>Fall</i>	<i>Spring</i>
	ES 295: Graduate Research (12)	ES 295: Graduate Research (12)
		Complete & defend dissertation

3.12 Sources of funding

Graduate students who received a funding offer with their admissions offer will have their financial support according to the terms of the funding offer. Funding will come through a combination of Teaching Assistantships, Graduate Research Assistantships, and/or Fellowships. Master's students are typically not expected to be funded by such means; but they may receive a funding offer with their admissions offer. More information on financial support can be found in the [Graduate Policies and Procedures Handbook](#).

3.13 Leaving the Program Prior to Completion of the PhD Requirements

A student admitted for the Ph.D. program, who, in the judgment of student's Candidacy Committee should not continue past the Master's degree, must be notified in writing by the Graduate Group Chair. A copy of the letter must be sent to the Vice Provost and Graduate Dean. In some cases, a doctoral student may choose to leave the program with a Master's degree only; the doctoral student must, however, meet the requirements of the M.S. degree. It is the responsibility of the Graduate Group Chair 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.

3.14 Transferring from M.S. to Ph.D. Program

A M.S. student who wants to transfer to the Ph.D. program before finishing his or her M.S. degree must go through a Ph.D. admission process managed by the ES Admissions Committee. This involves submitting a new Statement of Purpose addressing a possible dissertation topic, three new letters of recommendation (typically from ES faculty), a CV and a transcript to the Admissions Committee, as well as filling out the Change in Degree form (see Graduate Division P&P Handbook).

3.15 Earning a M.S. while in the Ph. D. Program, “Master’s along the way”

At the time of advancement to candidacy, resident Ph.D. students in the ES Ph.D. program who have not previously earned a Master’s degree in environmental systems or similar discipline may obtain a Master’s degree while working toward the Ph.D. degree. Students must get the approval of their faculty advisor. The master’s degree and the Ph.D. degree may not be conferred in the same term. Actions that are required to obtain the Master’s Along the way include:

Complete all course requirements for the appropriate Master’s Degree Plan. Courses units cannot be waived due to a prior M.S. Degree (see Section 3. Doctoral Degree Requirements.)

Submit a publishable manuscript as an addendum to the research proposal submitted for the Qualifying Examination to fulfill the thesis requirement of the M.S. Plan I degree or pass a Comprehensive Examination to fulfill the requirements of the M.S. Plan II degree. Students who choose the latter option, must pass the Comprehensive Examination before taking the Qualifying Examination for the Ph.D. degree. The Comprehensive Examination will follow the guidelines for Comprehensive Examinations outlined in Section 2.2.5.

Pass the Qualifying Examination for the Ph.D.

At the time of application for the Advancement to Candidacy for the Ph.D., the resident Ph.D. student should indicate on the form the intent to receive the master’s degree.

Apply for graduation for the Master’s Degree (specifying Plan I or II) with the Registrar’s office once the Advancement to Candidacy for the Ph.D. has been processed.

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, available on the Graduate Division Website.