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ACADEMIC SENATE, MERCED DIVISION  
GRADUATE COUNCIL (GC)  
VALERIE LEPPERT, CHAIR

UNIVERSITY OF CALIFORNIA, MERCED  
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**December 13, 2013**

**To: Peggy O'Day, Graduate Group Chair, Environmental Systems (ES)**

**From: Valerie Leppert, Chair, Graduate Council (GC)**

**Re: ES Degree Requirements for the MS and PhD Program**

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Graduate Council reviewed and unanimously approved the revised Environmental Systems degree requirements for the MS and PhD program submitted on December 10, 2013.

Cc: Graduate Council  
Graduate Division  
Angela Krueger, Substantive Change and Graduate Assessment Coordinator  
Tomiko Hale, SOE Graduate Student Programs Coordinator  
Choua Moua, Graduate Admissions Specialist  
Senate Office

## **ENVIRONMENTAL SYSTEMS GRADUATE GROUP DEGREE PROGRAM REQUIREMENTS**

### **M.S.: SUMMARY OF REQUIREMENTS (Thesis)**

- Complete at least two semesters of full-time academic residence at UC Merced (12 units minimum per semester)
- Complete a minimum of 24 units of courses at the upper division and graduate levels, with at least 20 units of graded graduate (200-level) courses in the major subject, including Environmental Systems (ES 200) (with letter grade "B" or better)
- Enroll in the Environmental Systems seminar (ES 291) twice for credit (S/U)
- Give a public oral presentation and successfully defend a M.S. thesis containing original research

### **For Advancement To Candidacy**

The requirements for advancement to candidacy are:

- A minimum of one semester of full-time residence (a total of 12 units)
- Completion of at least 12 units of graded graduate (200-level) courses

Advancement to candidacy must be filed at least one semester before completion of all degree requirements.

### **SELECTION OF A MAJOR PROFESSOR AND FACULTY COMMITTEE**

The heart of the Environmental Systems M.S. program is the completion of a piece of original scientific research leading to the preparation and defense of a M.S. thesis. We recommend that all M.S. students chose their major professors by the end of their first semester. Students are required to have selected a major professor by the end of their second semester. A major professor (the student's primary advisor) must be ladder-ranked ES faculty. The student and the major professor 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 both inside and outside UC Merced.

Once the M.S. student selects his/her major professor, he/she, in consultation with the major professor and program faculty, forms a degree committee. The role of the degree committee is to advise on and supervise the student's choice of courses, thesis research, serve on examination committees, and/or review and pass upon the merits of the thesis. The degree committee is composed of a minimum of three members, including the major professor, and the majority of the committee must be ladder ranked ES faculty. Other committee members may be regular or adjunct faculty from UC Merced, any UC campus, or an individual from outside the University of California who has special expertise and qualifications.

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 of time makes scheduling of examinations unreasonably difficult, the student may request that the committee be reconstituted. When membership changes must be made, the major professor in consultation with the student should recommend a new committee member, giving the reason for the change. Changes to the degree committee must be approved by the Dean of Graduate Studies.

## **REQUIREMENTS FOR THE M.S. DEGREE (THESIS)**

### **RESIDENCY**

The minimum residency requirement for any advanced degree is two semesters. M.S. students must be registered as a full-time student for at least one semester before advancement to candidacy, and for at least one semester after advancement to candidacy and before conferral of the degree. Ordinarily, a graduate student shall not receive credit for more than 12 units of graduate courses or more than 16 units of upper division courses in any term.

### **SCHOLARSHIP**

Graduate students must maintain at least a 3.0 grade-point average to be considered in good academic standing or to be awarded an academic graduate degree. Only courses in the 100 and 200 series in which the student receives grades of "A", "B", or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "C" 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.

A student whose cumulative graduate grade-point average falls below 3.0, or who is judged not to be making satisfactory progress toward the degree by his or her major professor or degree committee, will be placed on academic probation. The student will then be allowed a maximum of two semesters to make up the deficiencies. Students must make satisfactory progress on their programs of study as determined by their major professor.

### **COURSEWORK REQUIREMENTS**

Graduate students in the Environmental Systems group 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 Environmental Systems. Unit requirements are:

- Complete a minimum of 24 units of courses at the upper division and graduate levels, with at least 20 units of graded graduate (200-level) courses in the major subject, including Environmental Systems (ES 200) (with letter grade "B" or better)
- Enroll in the Environmental Systems seminar (ES 291) twice for credit (S/U)

### **Transfer Credit**

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 six units 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 regulations 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 the University.
- Requests for transfer credit are to be made prior to or at the time of advancement to candidacy. The major professor should make a request to the Graduate Dean specifying the units and courses involved, and provide an official transcript for the course (s).

### **FOR ADVANCEMENT TO CANDIDACY**

The requirements for advancement to candidacy are:

- A minimum of one semester of full-time residence (a total of 12 units)
- Completion of at least 12 units of graded graduate (200-level) courses

Advancement to candidacy must be filed at least one semester before completion of all degree requirements.

### **THESIS AND FINAL EXAMINATION**

The M.S. thesis must be written on a topic approved by the degree committee. The topic should be acceptable to all members of the degree committee, when they agree to serve, and a joint meeting of the committee members and the student should be held at that time. The M.S. thesis must be the student's independent and creative 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 student is encouraged to discuss with members of the degree committee both the substance and the preparation of the thesis well in advance of the planned defense date.

The student must provide a copy of the thesis to each member of the degree committee and allow each committee member at least two weeks to read and comment on it. If one or more committee members believe that there are significant errors or shortcomings in the thesis, or that the scope or nature of the work is not adequate, then the student must address these shortcomings before scheduling a defense. Once the committee members are in agreement that the thesis is ready to be defended (even though 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 Dean of Graduate Studies, and one copy of the thesis filed, no later than two weeks before the proposed date of the final examination.

The M.S. final examination consists of an open seminar on the M.S. work followed by a closed oral examination by the degree committee. All members of the degree committee must be in attendance for an oral M.S. final examination (connection via videoconferencing is acceptable). An ES faculty member of the degree committee, who is not the major professor, will chair the thesis defense. 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. A simple majority is required for a pass. All members of the degree committee sign the final thesis.

Members of the committee may vote to make conferral of the degree contingent on corrections and/or revisions to the thesis. In this case, the committee will select one member, normally the major professor, who will be responsible for approving the final version of the thesis that is submitted to Dean of Graduate Studies. If the thesis is regarded as of less than acceptable quality, the student should be given an appropriate period of time, clearly specified by the committee, in which to improve her/his work. If, after that period of time (usually a semester or more), the thesis is still unacceptable to a majority of the committee, the majority may recommend to the Dean of Graduate Studies that the student be disqualified from further graduate study.

### **NOMINAL TIME TO M.S. DEGREE**

The nominal time for completion of the M.S. program (with thesis) is 4 semesters. Completion of research towards the thesis often requires that the student work on his or her research project over the summer.

## **ENVIRONMENTAL SYSTEMS GRADUATE GROUP DEGREE PROGRAM REQUIREMENTS**

### **Ph.D.: SUMMARY OF REQUIREMENTS**

- Complete at least four semesters of full-time academic residence at UC Merced (12 units minimum per semester)
- For students *with* an appropriate M.S. degree: Complete a minimum of 12 units of graded Environmental Systems (ES) courses, including ES 200 (with letter grade "B" or better)
- For students *without* an appropriate M.S. degree: Complete the coursework requirement for the Environmental Systems M.S. degree *plus* a minimum of 12 units of graded Environmental Systems (ES) courses
- Enroll in the Environmental Systems seminar (ES 291) twice for credit (S/U)
- Pass the oral Ph.D. qualifying examination
- Approval of a written proposal on the proposed dissertation research topic
- Give a public oral presentation and successfully defend a doctoral dissertation containing an original contribution to knowledge in the field

Upon admission to the Ph.D. program, the student's major professor in consultation with the Admissions Committee will determine whether a prior M.S. degree fulfills the Environmental Systems M.S. coursework requirement.

### **FOR ADVANCEMENT TO CANDIDACY**

The requirements for advancement to candidacy are:

- A minimum of two semesters of full-time residence (total of 24 units)
- Completion of all other requirements listed above with the exception of the final dissertation defense

Advancement to candidacy must occur no later than the sixth semester of residence in the Ph.D. program.

### **SELECTION OF A MAJOR PROFESSOR AND FACULTY COMMITTEE**

The heart of the Environmental Systems Ph.D. program is the completion of a piece of original scientific research leading to the preparation and defense of a Ph.D. dissertation. To this end, each student should discuss research interests and possible Ph.D. projects with faculty in the group as early as possible, and select a major professor no later than the end of the second semester of study. A major professor (the student's primary advisor) must be ladder-ranked ES faculty. The student and the major professor 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 both inside and outside UC Merced. Unless the student already has chosen an adviser, a student will be assigned an interim adviser and an interim advising committee when they first enroll.

Once the Ph.D. student selects his/her major professor, he/she, in consultation with the major professor and program faculty, forms a degree committee to advise on and supervise the student's dissertation research, serve on examination committees, and review and pass upon the merits of the doctoral dissertation. Ph.D. degree committees consist of a minimum of four members, and the majority must be ladder-ranked faculty in ES. One committee member must be from outside of the ES group. He/she may be a regular or adjunct faculty member from UC Merced, any UC campus, or an individual from outside the University of California who has special expertise and qualifications.

All members of the degree committee must be in attendance for the qualifying and Ph.D. final examinations (connection via videoconferencing is acceptable). An ES ladder-ranked faculty member of the degree committee, who is not the major professor, will chair the examinations. If a committee member's absence from campus for an extended period of time 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 major professor in consultation with the student should recommend a new committee member, giving the reason for the change. Changes in committee membership must be approved by the Dean of Graduate Studies.

## **REQUIREMENTS FOR THE Ph.D. DEGREE**

### **RESIDENCY**

The minimum residency requirement for the Ph.D. degree is four semesters. Before advancement to candidacy Ph.D. students must be registered in regular University courses as a full-time student for at least two semesters. Ordinarily, a graduate student shall not receive credit for more than 12 units of graduate courses or more than 16 units of upper division courses in any term.

### **SCHOLARSHIP**

Graduate students must maintain at least a 3.0 grade-point average to be considered in good academic standing or to be awarded an academic graduate degree. Only courses in the 100 and 200 series in which the student receives grades of "A", "B", or "S" may be counted in satisfaction of the requirements for advanced degrees. A course in which a student receives a "C" 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.

A student whose cumulative graduate grade-point average falls below 3.0, or who is judged not to be making satisfactory progress toward the degree by his or her major professor or degree committee, will be placed on academic probation. The student will then be allowed a maximum of two semesters to make up the deficiencies. Students must make satisfactory progress on their programs of study as determined by their major professor.

### **COURSEWORK REQUIREMENTS**

As there is considerable amount of freedom in the program, Ph.D. students are expected to develop graduate level competency in both their specific area of research as well as in Environmental Systems. Students are expected to assume responsibility for designing his/her program in consultation with their major professor and faculty committee. Students are required to submit a program of study to the Graduate Group Advisor before registering the first semester in the program. Programs of study must be updated annually until the student is admitted to candidacy.

Coursework requirements are:

- For students *with* an appropriate M.S. degree: Complete a minimum of 12 units of graded Environmental Systems (ES) courses, including ES 200 (with letter grade "B" or better)
- For students *without* an appropriate M.S. degree: Complete the coursework requirement for the Environmental Systems M.S. degree *plus* a minimum of 12 units of graded Environmental Systems (ES) courses

- Enroll in the Environmental Systems seminar (ES 291) twice for credit (S/U)

Unit requirements for the M.S. degree are:

- Complete a minimum of 24 units of courses at the upper division and graduate levels, with at least 20 units of graded graduate (200-level) courses in the major subject, including Environmental Systems (ES 200) (with letter grade "B" or better)

### **Transfer Credit**

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 six units 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 regulations 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 the University.
- Requests for transfer credit are to be made prior to or at the time of advancement to candidacy. The major professor should make a request to the Graduate Dean specifying the units and courses involved, and provide an official transcript for the course(s).

### **Ph.D. QUALIFYING EXAMINATION**

All students in the Environmental Systems 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 a majority of formal coursework, but no later than before the end of the fourth semester in residence (excluding summer semesters), unless the student successfully petitions for a later date. The purpose of the exam is to test basic knowledge and the ability to formulate and defend two proposals for original research. The student's major advisor and other faculty may assist the student in preparing through recommended coursework, reading, or other avenues of investigation. The two proposals for the qualifying examination (five pages each) should present propositions for original research on two substantially different topics and outline a tractable approach for carrying out the research. The intent of this examination is to ascertain the breadth of a student's comprehension of fundamental facts and principles that apply in his or her major field of study, and the student's ability to implement research methods. Both requirements will also determine the student's ability to think critically about the theoretical and practical aspects of the field. Accordingly, the examination should be focused on the student's field of research but may and should venture into other areas of scholarship that underlie or impinge on the dissertation topic.

Proposal topics must be approved by the members of the student's degree committee. The student must meet with his/her degree committee not less than six weeks in advance of the oral examination for approval of the two proposal topics. Prior to this meeting, the student will submit draft titles of the proposals 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 clear, concise written proposals on the topics approved by the committee. The student will submit his/her proposals to the degree committee not less than two weeks before the oral examination date. Qualifying examinations may not be longer than three hours.

For each proposal, the degree committee will expect 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. Proposals may take the form of theoretical developments, computations, field and/or laboratory studies, the exploration of a new technique, or combinations of approaches. One proposal may be related to research that the student wishes to pursue for his/her Ph.D. dissertation, but this is not a requirement. The student is also permitted to develop proposals from work previously performed in a seminar or other coursework.

The date of the examination is arranged between the student and the committee members. The committee conducts the examination, and immediately thereafter submits the results of the examination to the Dean of Graduate Studies. Possible outcomes are:

- 1) Pass (conditions may not be appended to a pass decision)
- 2) Partial pass (acceptable conditions include prescribed courses or rewritten proposals)
- 3) Fail (one re-examination allowed)

The committee members should include in their evaluations of the student such factors as relevant portions of the previous academic record, performance on the examination, and an overall evaluation of the student's performance and potential for scholarly research as indicated during the examination and the research proposals. The committee should strive to reach a unanimous decision. If a unanimous decision is reached, the committee shall inform the student of its decision in one of the forms listed above. If the decision is "Partial Pass" or "Fail", the chairperson of the committee must include in a report a specific statement, which may include a minority report, explaining its decision and must inform the student of its decision. In the case of a "Partial Pass" the committee must include in its report a further statement of its terms and inform the student of those terms. In those cases when it is not possible for the members to resolve their differences, the student should be informed of the nature of those differences and each member should submit a detailed assessment of the student's performance to the Graduate Council. The Council will use these individual reports to adjudicate the result.

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 except that members may be replaced, with the approval of the major professor, 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 Dean of Graduate Studies.

### **RESEARCH PROPOSAL**

After successful completion of their oral examination, the student will prepare his/her research proposal in consultation with their major advisor, and will submit the completed proposal to committee members for review. The document (typically five to ten pages) will describe his or her research topic, summarize progress to date, and outline what he or she proposes to do, why it is relevant, and what will be learned. The committee will review this document and determine if the student has outlined a project that is appropriate for a Ph.D. Committee members will respond within two weeks of receiving the research proposal. If any committee member has serious reservations regarding proposal content, a meeting of the entire committee with the student will be called to discuss the proposed research. The student is then given a month to rewrite the research plan. After any revisions to the research proposal, the student will submit the final version to committee members for approval. Committee members will indicate their approval of the research proposal by signing the Advancement to Candidacy form.

### **ADVANCEMENT TO CANDIDACY**

The requirements for advancement to candidacy are (for student with a M.S. degree or after completion of the M.S. coursework requirements):



- A minimum of two semesters of residency
- Completion of the 12 graded ES courses (including Environmental Systems ES 200) with grade “B” or better
- Passing of the qualifying exam
- Approval of the written research proposal on his or her proposed dissertation topic

The student must fill out an application for advancement to candidacy that is signed by the major professor and the degree committee, the Environmental Systems Chair and submitted to the Dean of Graduate Studies. Upon advancement to candidacy for the degree, the degree 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.

### **DISSERTATION AND FINAL EXAMINATION**

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 degree committee both the substance and the preparation of the dissertation well in advance of the planned date of final examination and 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 final defense. If one or more 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 are in agreement 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 Dean of Graduate Studies, and one copy of the dissertation filed, no later than three weeks before the proposed date of the final examination.

The Ph.D. final examination consists of an open seminar on the dissertation work followed by a closed examination by the degree committee. During the examination, the student is expected to explain the significance of the dissertation research, justify the methods employed, and defend the conclusions reached. 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. A simple majority 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 major professor, who will be responsible for approving the final version of the dissertation that is submitted to Division of Graduate Studies. All members of the degree committee must sign the final dissertation.

### **NOMINAL TIME TO PH.D. DEGREE**

Nominal 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. Students entering the program without an M.S. degree typically will require an additional year or more of study to prepare themselves to complete their doctoral research.