

Welcome to the Environmental Health Sciences Graduate Program

FOREWORD

The purpose of this handbook is to provide specific information on policies, procedures, and regulations pertaining to graduate study in the Environmental Health Sciences Graduate Program.

Students completing degree requirements in the Graduate Program in Environmental Health Sciences will earn either the degree of Master of Science in Environmental Health Sciences or Doctor of Philosophy in Environmental Health Sciences. The doctoral program in Environmental Health Sciences is a research-based program with two tracks of study. The Environmental Toxicology Track focuses on identifying and quantifying the harmful effects of environmental chemicals on human health and elucidating the mechanisms by which these agents act. The Exposure Sciences and Environmental Epidemiology Track focuses on the evaluation of human exposures to environmental chemicals and on scientific principles used in evaluating risks to human health from environmental exposures. The master's program offers course work in environmental toxicology and exposure sciences with options to focus on experimental research.

Students in the Environmental Health Sciences Program are encouraged to meet with their faculty advisor and with other faculty members early in their first year to plan their programs of graduate study; this will permit students to accomplish their objectives in the most efficient and satisfactory manner. Each student should meet with all members of the Program's faculty to become familiar with their individual research interests before selecting a research topic and faculty advisor. The annual EHS Graduate Program Scientific Retreat in September provides new students to meet faculty and current students and hear about research within the program and possible MS thesis research or doctoral dissertation research projects. An introductory course, Principles of Toxicology, EHS 202, is offered in the fall, and Target Organ Toxicology EHS 206A,B are offered during the winter and spring quarters and are taught by several members of the Environmental Health Sciences faculty. These courses give a broad overview of toxicology to new students and allow students to make contact with many faculty during their first year of residence. Another introductory course, Introduction to Environmental Health Sciences (EHS 264) gives an overview of exposure sciences and environmental epidemiology and is offered during Winter quarter. Student-professor contact is also facilitated by active participation in the weekly seminar program.

Updates of this manual can be read on the Program's home page,
<http://www.medicine.uci.edu/occupational/graduate.asp>



Environmental Health Sciences Graduate Program Student Handbook

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I. ENTRANCE REQUIREMENTS

General requirements for admission to graduate study are given in the UCI General Catalogue in the section "Research and Graduate Studies" and in the Graduate Division bulletin "UCI Graduate Application for Admission". The catalogue is on-line and can be read at <http://www.editor.uci.edu>.

Table I lists the entrance requirements for graduate students majoring in Environmental Health Sciences. For cases in which students with deficiencies in certain areas are admitted into the graduate program, those deficiencies will be made up during the first year of residence in the program. The student will be notified of any apparent deficiency at the time of acceptance into the graduate program.

Table 1. Entrance Requirements for Students Applying to the Environmental Health Sciences Graduate Program	
<u>Subject</u>	<u>Number of years</u>
General Biology	One year of general biology; one quarter of molecular biology or biochemistry is strongly recommended.
Mathematics	One year of calculus and/or statistics
Chemistry	One year of chemistry; organic chemistry is strongly recommended for environmental toxicology track

II. GENERAL REQUIREMENTS FOR GRADUATE DEGREES AT UCI

Each student should become familiar with the descriptions of Academic Policies and Graduate Degrees in the Research and Graduate Studies section of the UCI General Catalogue. A graduate student is expected to complete satisfactorily at least 12 units of academic credit applicable to the graduate program in each regular academic quarter (fall, winter and spring) and satisfy all requirements of the academic program according to a schedule approved by the Director of the Graduate Program. Only grades A, A-, B+, B, and S represent satisfactory scholarship and may be applied toward advanced degree requirements. A UCI course in which a grade of B- is earned may be accepted in partial satisfaction of the degree requirements if the student has a grade point average of at least 3.0 in all courses applicable to the degree. Students may not apply courses graded Pass or Not Pass toward any degree or satisfactory progress requirements. A grade point average below the B level (3.0) is not satisfactory, and a student whose grade point average is below that level is subject to academic disqualification.

A graduate student who has not demonstrated satisfactory progress is not eligible for paid appointments, such as Graduate Student Researcher, and may not hold a fellowship or other award, which is based upon academic merit; this includes appointment as a teaching assistant or as a predoctoral trainee on federal training grants.

The Dean of Graduate Studies may disqualify a student who has a grade point average in graduate and upper-division courses below 3.0 for two or more successive quarters, or fails to pass or does not take the required examinations within the time specified for the graduate program, or does not maintain satisfactory academic progress toward completion of the program.

III. REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL HEALTH SCIENCES

The predoctoral student must complete the following requirements (explained in detail below) to qualify for the degree of Doctor of Philosophy in Environmental Health Sciences:

- I A major program of study (courses and research) including a comprehensive written preliminary examination and an oral qualifying (advancement to candidacy) examination.
2. A written dissertation based on the student's original research, and a successful defense of the dissertation during an oral examination given by the student's doctoral committee.
3. Full-time residence for at least 6 regular academic quarters.

Ph.D. PROGRAM CURRICULUM PLAN: First and Second Years



Program-wide Core Curriculum – for PhD students in both Environmental Toxicology Track and Exposure Sciences and Environmental Epidemiology Track

Two of:

EHS 206 A	Target Organ Toxicology A	4 units
or		
EHS 206B	Target Organ Toxicology B	4 units
or		
EHS 202	Principles of Environmental Toxicology	4 units
EHS 264	Intro to Environmental Health Science*	4 units

One of:

EPIDEM 200	Principles of Epidemiology	4 units
or		
PUBHLTH 206	Epidemiology in Public Health	4 units
EHS 298	Environmental Health Sciences Seminar	2 units

Track-specific Core Courses – Environmental Toxicology Track

EHS 201	Case Studies in Environmental Toxicology	4 units
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Third of EHS 202, EHS 206A, or EHS 206B not taken as part of the general core

One of the following 2 introductory statistics courses:**

PUBHLTH 207A	Public Health Statistics	4 units
or		
EPIDEM 204	Biostatistics	4 units

Approved Electives, 16 units

*EHS 270 may be substituted with the approval of the advisor if the student already possesses a background in environmental health sciences

**If you are at all unsure about your choice of track, you should take PUBHLTH 207A because it is only offered once per year and is the first of a sequence of 2 courses required for the Exposure Sciences track.

Track-specific Core Courses – Exposure Sciences and Environmental Epidemiology Track

PUBHLTH 207A,B	Public Health Statistics I and II	4 units/qtr
PUBHLTH 283	Geographic Information Systems	4 units
EPIDEM 205	Environmental Epidemiology	4 units

One of:

EHS 275	Environmental Modeling and Risk Assessment	4 units
or		
PUBHLTH 260	Human Exposure Assessment	

Approved Electives, 8 units

Approved Elective Pool *

EHS 203	Psychosocial Occupational Epidemiology	4 units
EHS 204	Neurotoxicology	4 units
EHS 212	Inhalation Toxicology	4 units
EHS 220	Industrial Toxicology	4 units
EHS 269	Air Pollution, Climate and Health	4 units
EHS 270	Human Exposure to Environmental Contaminants	4 units
EHS 294	Occupational Health Psychology	4 units
PUBHLTH 276	Toxic Chemicals in the Environment	4 units
MBB 203	Structure/Biosyn. Nucl. Acids	4 units
MBB 204	Structure/Biosyn. of Proteins	4 units
DCB 231B	Cell Biology	4 units
PATH 225	Molecular Mechanisms of Disease	3 units
Anatomy 203A,B	Human Microscopic Anatomy	6 units
Physiology 206A,B	Introduction to Medical Physiology	11 units
PUBHLTH 265	Advanced Environmental Health Science	4 units

*any core courses in either track may be taken as electives by students in the other track; additional courses may be added to this pool upon approval of the Program Faculty

Third and Fourth Years

EHS 298	Environmental Health Sciences Seminar	2 units/qtr.
EHS 299	Research Problems	1- 12 units/qtr.

A sample program is give below for each track.

Sample Program – Environmental Toxicology Track

1 st yr. Fall	EHS 202 4 units	PUBHLTH 206 4 units	EHS 298, 2 units	EHS 299, 2 units
1 st yr. Winter	EHS 206A 4 units	PUBHLTH 207A, 4 units	EHS 298, 2 units	EHS 264, 4 units
1 st yr. Spring	EHS 206B 4 units	EHS 201, 4 units	EHS 298, 2 units	EHS 299, 2 units
1 st yr. Summer	research rotation			
2 nd yr. Fall	elective, 4 units		EHS 298, 2 units	EHS 299, 6 units
2 nd yr. Winter	elective, 4 units		EHS 298, 2 units	EHS 299, 6 units
2 nd yr. Spring			EHS 298, 2 units	EHS 299, 10 units
2 nd yr. Summer	Comprehensive exam	Preadvancement meeting		
Yr 3	Qualifying exam	Electives, 8 units	EHS 298, 2 units	EHS 299, 6 units
Yrs 4-5	yearly progress meeting with dissertation committee		EHS 298, 2 units	EHS 299, 10 units

Sample Program – Exposure Sciences and Environmental Epidemiology Track

1 st yr. Fall	EHS 202 4 units	PUBHLTH 206 4 units	EHS 298, 2 units	EHS 299 2 units
1 st yr. Winter	EHS 206A 4 units	PUBHLTH 207A, 4 units	EHS 298, 2 units	EHS 264, 4 units
1 st yr. Spring	elective 4 units	PUBHLTH 207B, 4 units	EHS 298, 2 units	EHS 299, 2 units
1 st yr. Summer	research rotation			
2 nd yr. Fall		elective, 4 units	EHS 298, 2 units	EHS 299, 6 units
2 nd yr. Winter	EHS 275 4 units	PUBHLTH 283, 4 units	EHS 298, 2 units	EHS 299, 2 units
2 nd yr. Spring	EPIDEM 205 4 units		EHS 298, 2 units	EHS 299, 6 units
2 nd yr. Summer	Comprehensive exam	Preadvancement meeting		
Yr 3	Qualifying exam (summer)		EHS 298, 2 units	EHS 299 10 units
Yrs 4-5	yearly progress meeting with dissertation committee		EHS 298, 2 units	EHS 299, 10 units

Environmental Health Sciences Course Descriptions

201 Case Studies in Environmental Toxicology (4) S. Interactive case studies in environmental toxicology. Prerequisite: EHS 206A-B, or consent of instructor. (Staff)

202 Principles of Environmental Toxicology (4) F. Key principles of toxicology will be discussed: quantitative dose-response relationship; toxicant-target interactions; complete *in vivo* metabolism of xenobiotics by mammalian systems; integration of organ responses to toxic agents. (Kitazawa)

203: Psychosocial Occupational Epidemiology (4) W. Critical review of the internal and external validity of epidemiological studies on psychosocial work environment and diverse health outcomes. Students are required to submit critical reviews on assigned papers. (Choi)

204 Neurotoxicology (4) W, even years. The effects of various harmful chemicals upon nervous system function. Emphasis given to the molecular events underlying neurological damage and to the relation of such processes to basic mechanisms of neurobiology. (Bondy)

206A-B Target Organ Toxicology (4,4) W,S. Analysis of the responses occurring in individual organs of man and animals exposed to environmental chemicals at toxic levels; distinctive structural and functional features of ten organ systems are presented in terms of phenomena, mechanisms of action, and methods of study. (Staff)

212 Inhalation Toxicology (4) S, odd years. The principles and practice of laboratory inhalation toxicology. Topics include aerosols, gases, respiratory tract structure and function, lung defenses, aerosol deposition exposure techniques, characterization of exposure atmospheres, experimental designs, animal models, research ethics, and regulations and guidelines. (Phalen)

220 Industrial Toxicology (4) S, odd years. Analysis of responsibilities toxicologists have in industry, including product safety generating material safety, data sheets, animal testing, ecotoxicological testing, risk/hazard communication, and assisting industrial hygienists and occupational physicians; emphasis on interdisciplinary nature of industrial toxicology and communication skills. Prerequisite: TOX 206A-B. (Lambert)

264 Environmental Health Sciences I: Introduction to Environmental Health Science (4). Convergence of agents (chemical, physical, biological, or psychosocial) in the environment can emerge as diseases influenced by social, political, and economic factors, allowing them to become rooted in society. How these agents from various spheres come together and impact human health. Prerequisite: graduate standing or consent of instructor. Same as Public Health 264/ Environmental Health, Science, and Policy E224/Epidemiology 264. (Wu)

269 Air Pollution, Climate, and Health (4). Emission of air pollutants into the atmosphere, physical and meteorological processes that affect transport, and influence on global warming. Concepts of how and where people are most exposed, and how exposures and health effects

differ in developed and developing regions. Same as Epidemiology 270/Public Health 269 and Environmental Health, Science, and Policy E247. (Wu)

270 Human Exposure to Environmental Contaminants (4). Introduces founders of conceptual thought that environmental contaminants can impact health. Theory and principles of exposure assessment, the continuum from emissions of a contaminant into the environment to evidence of health effects in a population. Same as Epidemiology 270/Environmental Health, Science, and Policy E248/Public Health 270. (Edwards)

275 Environmental Modeling and Risk Assessment (4). This course surveys the general principles, basic mathematical methods, and practices of environmental modeling and human health risk assessment. Topics include advection-dispersion models for contaminants in air and water, uptake by plants and animals, dose-response modeling, risk management, and risk perception. Although the emphasis is on environmental toxicants, infectious disease transmission models are briefly introduced. Students conduct an original risk assessment as a final group project. Same as Public Health 275 (Bartell).

290 Independent Study in Environmental Health Sciences (2-12) F,W,S. With consent from a faculty member who will supervise the program, a student may receive credit for individual study in some area of toxicology, culminating in the completion of a scholarly paper on the subject. May be repeated for credit. (Staff)

294 Occupational Health Psychology (4) S. Introduction to psychosocial work environment that affects the health and productivity of workers. Work stress models, exposure assessment of work stressors and instruments, health effects of work stressors (e.g., cardiovascular responses), and the management and prevention of work stress will be reviewed and discussed. (Choi)

297 Advanced Topics in Occupational Toxicology (2) F,W,S. Discussions with clinical and research faculty in Environmental Health Sciences and occupational medical on current toxicology problems in the workplace and critical review of current publications in the field. Journal club/seminar format. (Boomus).

298 Environmental Health Sciences Seminar (2) F,W,S. Presentation and discussion of current research problems and issues by students, postdoctoral fellows, faculty, and guests, covering the broad research and policy areas of Environmental Health Sciences. (Luderer)

299 Research Problems (1 to 12) F,W,S. Research work for the M.S. thesis or Ph.D. dissertation. (Staff)

Seminar

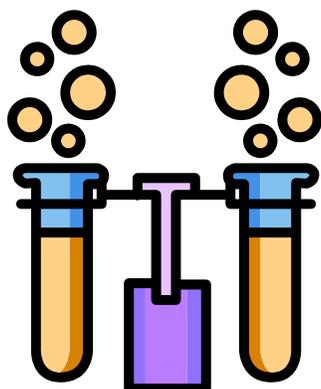
The Environmental Health Sciences Seminar (EHS 298) is a required course for each graduate student in the program for each quarter the student is in residence. The seminar is organized by the faculty and graduate students and features one speaker-discussion leader on Fridays at 3:30 p.m. during fall, winter and spring quarters. This is the one opportunity on a weekly basis that brings the faculty and students together, and all students in the program are required to attend all EHS 298 seminars and to take active parts in the discussions. The faculty are also expected to attend seminar. Individual presentations last about one hour; each masters' student will present a seminar once a year. Each predoctoral student will present two seminars per year if they did not do a research in progress talk at the annual EHS Scientific Retreat in September. For first and second year predoctoral and first year masters students the subject of the seminar should be on a topic in toxicology in which they have special interest but not a report of their own on-going research. Senior graduate students can make their research efforts the subject of one of their seminar presentations each year. The student's grade (A, B, etc) for seminar will be based on the student's attendance, participation in the discussions, and presentation during quarters in which the student presented. Presentation criteria include:

1. ability to analyze environmental health problems rather than merely describe them
2. thoroughness with which the topic was reviewed and presented
3. ability to respond adequately to questions from the audience
4. ability to communicate one's ideas, i.e. a clear and interesting presentation, including public speaking skills and illustrations (slides, etc.)

Students should follow the steps below in preparing their seminar presentations.

1. select the topic carefully; consult with the seminar coordinator (Dr. Luderer), your research advisor and other faculty members if you need help choosing a topic. The topic must be in the areas of toxicology, exposure sciences, or risk assessment, should be based on scientific evidence, and should be analytical ('why is something toxic; "what is the scientific evidence that something causes a specific response') rather than descriptive ('compound A causes renal damage'). Stress mechanisms of toxic action or exposure pathways, integrate exposure and toxicity wherever possible.
2. begin preparing early; it can take up to 50 hours to prepare an excellent presentation.
3. do a literature search to make sure you have covered all the pertinent areas.
4. read all of your material before writing your presentation; take notes and make outlines. Ask yourself questions; this may suggest further searching of the literature.
5. integrate your material and decide what information you want to present, what order you want to use to present your material, and how you are going to present it (verbally, slide with text or table or graph or photograph, etc). Select a few key articles and present and discuss data from those articles to make key points.
6. write out your presentation.
7. consult with a faculty member to make sure you are on the right track.
8. prepare your Powerpoint presentation
9. practice giving the presentation
10. don't read from notes; use your graphic material as 'cue cards'.

Research Rotations



The new student is expected to get involved in research at the earliest possible time, usually in the first quarter of the program. All students are encouraged to take advantage of the rotation option. A rotation consists of a series of residencies in laboratories/research groups of the student's choice; one quarter is spent in each laboratory/research group. Three rotations per academic year and one rotation during summer quarter of the first year are possible; two are suggested. Professors will be responsible for acting as an advisor/mentor to the student and instructing the student in proper laboratory procedures, experimental design, and data analysis/scientific interpretation. If the entering student is sure of the area in which he/she wants to work, a research rotation is not required.

Comprehensive Examination

A written comprehensive examination is given by the Environmental Health Sciences faculty, usually at the end of the second year of study early during Summer quarter. The examination evaluates the student's knowledge of the fields covered by the core courses. The student must demonstrate competence in the core subjects and the ability to think analytically in order to continue to the dissertation research. All program faculty members can participate in preparing examination questions, but generally only those who have taught in the core courses do so. Students are required to answer a percentage of these questions, although some questions may be mandatory. The comprehensive examination is open book/open note. A scientific calculator is permitted, but laptops and other electronic devices are not permitted. The exam is given in two days over a five-hour period each day, with 7 problems each day. Students are required to answer at least 10 and pass at least 9 of the 14 questions. Responses are graded pass/fail. The student about to take this examination is encouraged to consult faculty and senior graduate students who have recently completed this requirement to get an idea of the nature of the examination and sample questions. Students narrowly failing the examination will be permitted to retake the examination within 12 months. Failure on the

second attempt of the retake leads to disqualification from the predoctoral program; under such circumstances the student may petition the faculty to transfer to the master's degree program.

QUALIFYING EXAMINATION/ ADVANCEMENT TO CANDIDACY

Preadvancement committee meeting

A preadvancement committee meeting is required by the beginning of the third year and preferably during the summer of the second year. The committee should consist of the faculty advisor and two to three other Environmental Health Sciences faculty members, who will also serve on the qualifying/advancement to candidacy committee. The purpose of this meeting is to ensure that all students have accomplished reasonable progress in their research during their first two years in the Environmental Health Sciences graduate program. There is no written component for this meeting. However, all students are expected to prepare a presentation (between 30-45 min) for the pre-advancement meeting. During the oral presentation the committee will discuss the research with the student. After this discussion, the committee will excuse the student from the room and evaluate the student's performance. The committee recommendations should be written on the Advisement Committee Meeting Report form, which should be signed by the student and committee members.

Timing of the examination

An oral qualifying examination is required and should be taken not later than the twelfth quarter after entrance into the program; usually it is given during winter, spring, or summer quarter in the third year of graduate study.

Qualifying examination committee

It is administered by the Candidacy Committee for the individual student. Committee members are recommended by 1) the Director of the Environmental Health Sciences Program, 2) the student's research advisor, and 3) the student, and approved by the Director of the Environmental Health Sciences Graduate Program and the Dean of Graduate Studies and Research. The Candidacy Committee is comprised of five members, a majority of whom are members of the program faculty. The Chair of the Candidacy Committee must be a member of the program faculty and a voting member of the Academic Senate. The UCI Faculty Bylaws requires that all members of the Candidacy Committee be voting members of a UC academic senate; as the number of the faculty in the Environmental Health Sciences program is small, exception to this rule to permit non-tenured Environmental Health Sciences faculty to serve on these committees can be approved by the Dean of Graduate Studies if the exception is well-justified. One member of the Candidacy Committee, designated the "outside member," must be a voting member of the UC Academic Senate - not necessarily the Irvine Division - who does not hold an appointment in the student's discipline or academic unit (school or independent program). As the outside member represents the UC faculty at large, special expertise in the area of the student's dissertation is not necessary. Three members of the Candidacy Committee will continue, after the student has successfully completed the oral examination and advanced to candidacy, as the Doctoral Committee to supervise completion of the research dissertation.

The names of the proposed faculty members for the Candidacy Committee must be submitted to the Graduate Studies Office by the Director of the graduate program at least two weeks prior to the date of the qualifying examination.

Goal of the exam

The purpose of the exam is to determine if the student is capable of Ph.D. quality research.

This encompasses two related aspects: 1) defining a tractable research problem; and 2) demonstrating requisite knowledge, skills and experimental sophistication to convince the committee that there is a high probability for the project to succeed. The Advancement to Candidacy Exam is a University-level requirement.

Written Proposal. A written proposal in the format of a federal grant proposal should be prepared by the candidate and distributed to the committee **at least 1 week prior** to advancement.

Written Proposal Format. The proposal should follow conventional format for a federal grant. The manuscript should be prepared with proper scientific nomenclature, as would be acceptable to a granting agency. The document should be approximately 12-15 pages (single-spaced with 1 inch margin) excluding references. The document should include the following sections.

Specific Aims (1 page). It is the single most important section in the proposal. It's the master plan for the rest of the proposal and the most difficult section to write. The logic of each aim must be compelling and the answers must be important to the field. Whenever possible, test a hypothesis in the specific aim title. The Specific Aims should not be a list of experiments. Avoid writing aims that can be viewed as "a fishing expedition".

Introduction (2-3 pages). Problems and objectives of your research should be clearly stated and placed in the context of a broader field. An extensive bibliography should be included. This section should lead the reader to each question or hypothesis that you're testing in each aim. Significance of the project should be also included here.

Preliminary results (3-5 pages). This section should include your research efforts. Appropriate discussion and methods are important; you should show how you can perform all of the necessary techniques and methods. Please embed figures into the text and include a brief legend. Figures and Tables must be absolutely clear and visible.

Proposed research (6-8 pages). The proposal should address the feasibility of various experiments or analyses and point out pitfalls that might be encountered and how these could be circumvented. Be sure to include positive and negative controls, analysis and interpretation, pitfalls and alternative approaches, and somewhat detailed methods.

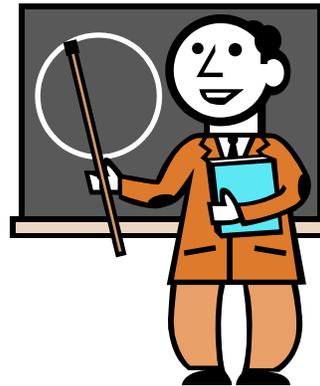
Oral Presentation Format. The oral portion of the exam will involve the presentation of background material, preliminary results and a summary of proposed experiments. The presentation should be

~20-30 minutes (20-30 PowerPoint slides), although committee discussion will usually interrupt the flow. During this time the committee will evaluate whether or not you have the ability to formulate questions on important environmental health sciences issues. You may be asked to discuss experimental design, required controls for an experiment, and possible artifacts or caveats. You will be expected to place the significance of the research project in a broad context, and demonstrate in-depth knowledge of the discipline in which you are working. The exam should be scheduled for a three hour time period, although it will typically last about two hours.

The proposal and presentation serve as the initial focus of the qualifying examination; that is, it starts the examination in an area in which the student should feel comfortable. This mitigates some of the nervousness students may experience in taking a critical oral examination before a faculty panel. (The proposal can also serve as a guide to the student's dissertation research program; however, the

student is not obligated to follow the course of studies in that proposal in developing the final dissertation.) It is recommended that students practice answering incisive questions orally before taking this examination. Students who fail this examination may be given the opportunity to stand for re-examination at the discretion of the Candidacy Committee. Re-examination should occur within 6 months of the first qualifying examination. Students failing the second examination are disqualified from the doctoral program; they may petition the program faculty to transfer to the master's degree program

The results of the Qualifying Examination will be submitted to the Office of Graduate Studies on the Ph.D. Form I. This form can be downloaded from Graduate Division <http://www.grad.uci.edu/forms/> The form must be signed by all committee members at the time the candidacy examination is concluded and submitted even if the examination was failed. If the unanimous recommendation of the Committee is favorable, a \$90 Advancement to Candidacy Fee must accompany the Form I (paid by the student, unless other arrangements have already been made).



Teaching Requirement

There is no official teaching requirement for the EHS Graduate Program. However, each doctoral student is encouraged to serve as a teaching assistant in an undergraduate course in the School of Biological Sciences or the Program in Public Health for at least one quarter. Serving as a teaching assistant may also be required as part of your funding.

Dissertation and Final Examination

The dissertation will present basic research on an original research problem in Environmental Health Sciences. The research will demand an intensive concentration of the student's time, effort and energy, and the faculty advisor will encourage the student to work with greater independence as progress is achieved. Progress in the research project is followed by the student's Doctoral Committee during at least annual meetings with data presentations by the student. The student is encouraged to seek consultation with faculty members, and other scientists and professionals outside the University to make the research experience as enriching as possible.

When the student and/or advisor feels the student has learned how to do original and independent research and has produced publishable results, the student should present his/her experimental results to the candidate's Doctoral Committee; when the Committee agrees that the experimental work should terminate, the candidate begins writing the dissertation. The student submits draft copies of the written dissertation to each member of his/her Doctoral Committee for review and approval (this review takes approximately a month).

The Doctoral Committee supervises a final examination, the focus of which is the content of the doctoral dissertation (dissertation defense). Ordinarily, the final examination will be given just prior to the completion of the dissertation and while the student is in residence during a regular academic session, and will be open to all members of the academic community. The defense is usually conducted in the same format as a seminar.

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 final copy must meet the University's requirements for style, format, and appearance before the degree can be conferred. This information is available on the following web site, <http://www.grad.uci.edu/academics/degree-completion/instructions-for-electronic-submission.php>

After the dissertation has been approved by the Doctoral Committee, a final copy of the dissertation must be submitted, with the appropriate forms. The electronic submission option is now the preferred option, although paper submission is still permitted. In either case, the document will be examined to assure that it meets all University requirements. More information about submission requirements can be found on the Graduate Division website above. The student must also provide one copy of the dissertation for each member of his/her Doctoral Committee and one copy for the Graduate Program in Environmental Health Sciences.

Upon completion of the dissertation defense and approval of the dissertation, the Doctoral Committee recommends, by submission of the Ph.D. Form II, the conferral of the Ph.D. degree, subject to final submission of the approved dissertation for deposit in the University Archives.

The expense of preparing the written dissertation is borne by the student. The Environmental Health Sciences Program does provide, without charge to the student, use of microcomputers and word processing and graphics software for preparing the document.

IV. REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ENVIRONMENTAL HEALTH SCIENCES

Requirements for the M. S. degree may be satisfied in one of two ways. Under Plan I, the student completes the Environmental Health Sciences core program with an average grade of B or above and under the direction of a faculty advisor also prepares a thesis that is acceptable to the thesis committee. Under Plan II, the student completes the core program, prepares a scholarly paper based on individual study in an area of toxicology or exposure sciences under supervision of a faculty member, and satisfactorily passes the written comprehensive examination at the M.S. level.

Plan I

Each candidate for the Master of Science degree Plan I must participate in Environmental Health Sciences Seminar (EHS 298), prepare a research thesis, complete the required courses listed below, meet the University requirements for residence (at least three quarters) full-time enrollment (12 upper division or graduate units each quarter, including credit for supervised research or teaching), and satisfactory progress (at least 8 units of graduate or upper division credit completed each quarter with grades of B's, or above). 24 core course units and 8 elective units in approved courses are required, plus 2 units of EHS 298 each quarter and at least 8 units of Research Problems (EHS 299). This Plan requires at least 5 quarters and up to 7 quarters to finish (including Summer between years 1 and 2).

CORE CURRICULUM – Plan I

Two of:

EHS 206 A	Target Organ Toxicology A	4 units
or		
EHS 206B	Target Organ Toxicology B	4 units
or		
EHS 202	Principles of Environmental Toxicology	4 units
EHS 264	Intro to Environmental Health Science*	4 units

One of:

EPIDEM 200	Principles of Epidemiology	4 units
or		
PUBHLTH 206	Epidemiology in Public Health	4 units
EHS 298	Environmental Health Sciences Seminar, 2 units per quarter	

*EHS 270 may be substituted with the approval of the advisor if the student already possesses a background in environmental health sciences
Approved electives, 8 units selected from the pool below.

The number of units required for the Environmental Health Sciences M.S. degree in Plan I is 20 program-wide core course units, at least 8 seminar (EHS 298) course units, and 8 units of approved electives for a total of 36 course units, plus at least 8 Research Problems (EHS 299) units.

APPROVED ELECTIVE POOL*

EHS 201	Case Studies in Toxicology	4 units
EHS 203	Psychosocial Occupational Epidemiology	4 units
EHS 204	Neurotoxicology	4 units
EHS 212	Inhalation Toxicology	4 units
EHS 220	Industrial Toxicology	4 units
EHS 269	Air Pollution, Climate and Health	4 units
EHS 270	Human Exposure to Environmental Contaminants	4 units
EHS 294	Occupational Health Psychology	4 units
EHS 275	Environmental Modeling and Risk Assessment	4 units
PUBHLTH 260	Human Exposure Assessment	4 units
PUBHLTH 283	Geographic Information Systems	4 units
PUBHLTH 276	Toxic Chemicals in the Environment	4 units
EPIDEM 205	Environmental Epidemiology	4 units
MBB 203	Structure/Biosyn. Nucl. Acids	4 units
MBB 204	Structure/Biosyn. of Proteins	4 units
DCB 231B	Cell Biology	4 units
PATH 225	Molecular Mechanisms of Disease	3 units
Anatomy 203A,B	Human Microscopic Anatomy	6 units
Physiology 206A,B	Introduction to Medical Physiology	11 units

*third of EHS 202, EHS 206A or EHS 206B not taken as part of required core courses may be taken as an elective; additional courses may be added to this pool upon approval of the Program Faculty

Thesis Plan I

The Masters student is required to write a thesis based on a research problem the student has worked on under faculty supervision in the area of Environmental Health Sciences. The first-year student in Plan I is expected to get involved in a research project at the earliest possible time, usually in the first quarter of the program. When a student is unsure of where to work, that student is encouraged to take advantage of the research rotation option. A rotation will consist of up to one quarter residence in a laboratory/research group of the student's choice.

A committee of three faculty members recommended by the Graduate Advisor and officially appointed by the Dean of Graduate Studies is appointed to guide the student through the research problem and determine when a sufficient amount of work has been completed satisfactorily. At that time, the student presents the research results to the committee; after successful presentation of the results, the student can advance to candidacy for the Master of Science degree. **The student must advance to candidacy no later than one quarter before the quarter in which the degree is expected to be awarded. The deadline for submitting the advancement to candidacy form is 30 days before the opening of the quarter in which the degree is expected to be awarded.** The student should be in continual contact with the committee as the work progresses to ensure prompt completion of an appropriate thesis. All three members of the committee must approve the thesis and sign the title page of the approved final version. After the committee has approved the thesis, the

thesis must be submitted electronically or as a paper copy. The final copies of the thesis must be accepted before the degree can be conferred. Copies of the *Standard and Procedures Manual* are available at

<http://www.grad.uci.edu/academics/degree-completion/instructions-for-electronic-submission.php>

Plan II (Comprehensive Examination Plan)

The Master's student in Plan II is required to write a scholarly paper based on individual study the student has done under faculty supervision; while writing the scholarly paper, the student enrolls in EHS 290 (usually 4 units during Spring quarter of year 1, with completion of the paper during summer of year 1). The student must also pass a written comprehensive examination based on the required course work, which is scheduled early during summer quarter of year 1. After completion of the examination, the student can advance to candidacy for the Master of Science degree. **The student must advance to candidacy no later than one quarter before the quarter in which the degree is expected to be awarded. The deadline for submitting the advancement to candidacy form is 30 days before the opening of the quarter in which the degree is expected to be awarded.** This Plan requires 4 quarters to complete (Fall, Winter, Spring, and Summer quarter).

CORE CURRICULUM – Plan II

EHS 206 A-B	Target Organ Toxicology	6 units/qtr.
One of the following 2 introductory statistics courses:		
PUBHLTH 207A	Public Health Statistics	4 units
or		
EPIDEM 204	Biostatistics	4 units
EHS 264	Intro to Environmental Health Sciences*	4 units
EPIDEM 200	Epidemiology	4 units
EHS 298	Environmental Health Sciences Seminar, 2 units per quarter	

*EHS 270 may be substituted with the approval of the advisor if the student already possesses a background in environmental health sciences

Approved electives, 8 units selected from the pool for Plan I above.

The number of units required for the Environmental Health Sciences M.S. degree in Plan II is 20 program-wide core course units, at least 6 seminar (EHS 298) course units, and 8 units of approved electives for a total of 34 course units, plus at least 4 Independent Study (EHS 290) units.



V. GRADUATION AND DIPLOMA INFORMATION (MS AND Ph.D.)

A student who expects to complete all requirements for an advanced degree in a given quarter must be advanced to candidacy for that degree 30 days prior to the first day of the quarter in which the degree will be conferred. Students must complete the Graduate Student Diploma and Commencement form and are responsible for providing accurate information that will be printed on their diploma and in the commencement program.

Questions regarding eligibility to participate in spring commencement and the logistics of commencement exercises should be directed to the Office of Graduate Studies, and the Commencement Office.

VI. GRADUATE STUDENT RESEARCHERS

A Graduate Student Researcher performs research related to his or her degree program in an academic department or research unit under the direction of a faculty member. Appointment as a Graduate Student Researcher, in combination with other University appointments, may not exceed half time (50%) during the academic quarters. During the summer recess, appointments may be increased to 100 percent.

Student fees (including graduate student health insurance fee) and nonresident tuition, if applicable, may be paid for Graduate Student Researchers with appointments of 25% time or more by the hiring funding source, including federal grants and contracts. Students eligible for appointments as Student Researchers are so notified at the time of acceptance into the graduate program.

VII. TEACHING ASSISTANTSHIPS

There are no undergraduate students in the School of Medicine. As teaching assistantships are awarded to graduate students to teach undergraduate courses, no teaching assistantships are available through the School of Medicine. Graduate students in Environmental Health Sciences are eligible for teaching assistantships in the School of Biological Sciences and the Program in Public Health if these units are not able to fill all of their teaching assistantship positions with their own graduate students.

VIII. REGISTRATION PROCEDURE

Enrollment consists of two separate steps: 1) enrollment in classes and 2) payment of fees. Both steps must be completed to be officially registered for the term. Access WebReg for information

as to enrollment dates. Students may check their ZOT account online at:
<http://www.reg.uci.edu/registrar/soc/webreg.html>



IX. FACULTY

[Ulrike Luderer, MD, PhD, MPH](#) — Director, Environmental Health Sciences Graduate Program

Luderer's research on reproductive and developmental toxicology is focused on understanding the role(s) of oxidative stress and antioxidants in ovarian toxicity, ovarian aging and ovarian cancer. A second area of focus is developmental toxicology of the reproductive system, specifically the developmental basis of premature ovarian failure and ovarian cancer.

[Dean B. Baker, MD](#) — Professor Emeritus

Baker's epidemiologic research is focused on environmental studies of hazardous waste sites, childhood exposure to environmental pollutants, asthma among inner-city children, the role of irritant exposure in occupational asthma, occupational stress, indoor air pollution and the use of biological markers of exposure for subclinical effects.

[Scott M. Bartell, PhD](#)

Bartell's research in exposure sciences and risk assessment focuses on probabilistic models and statistical methods for exposure assessment, environmental epidemiology and risk decision analysis.

[Bruce Blumberg, PhD](#)

Blumberg's research focuses on the role of nuclear hormone receptors in development, physiology and disease and how these may be disrupted by hormonally active compounds in the diet and environment. Particular research interests are the effects of environmental endocrine disrupting chemicals (obesogens) on the development of obesity and on the role of highly chlorinated chemicals such as PCBs and PBDEs on the development of the immune system and on lymphoma.

[Stephen C. Bondy, PhD](#)

Bondy's research in molecular neurotoxicology focuses on the potential role of toxic agents in the promotion of brain aging and neurological disease. Studies include evaluation of agents that accelerate or retard the aging process. Endpoints range from behavioral tests to assay of gene expression. In addition, the properties of aluminum that relate to neurotoxicity and its possible contribution to Alzheimer's disease are being investigated.

[Vincent J. Caiozzo, PhD](#)

Caiozzo's expertise is in structure and function of muscle with an emphasis on exercise physiology. He has a special interest in the role of environmental toxicants in modulating physiological responses in human muscle.

[Jefferson Y. Chan, MD, PhD](#)

Chan's research in chemical pathology focuses on the oxidative stress response in cells exposed to toxic xenobiotics.'

[Bongkyoo Choi, PhD:](#)

Choi's research is focused on occupational epidemiology, occupational health psychology (work stress), work and obesity in firefighters and transit operators, ambulatory monitoring of heart rate and heart rate variability, and workplace health promotion.

[Derek Dunn-Rankin, PhD](#)

Dunn-Rankin's major research focus is on laser and optical diagnostics in practical systems, optical particle sizing, droplet formation and vaporization and their application to human exposures.

[Rufus D. Edwards, PhD](#)

Edwards' research in exposure sciences and risk assessment focuses on air pollution, particles, volatile organic compounds, greenhouse gases and environmental epidemiology in the developing world and European cities.

[Chenyang \(Sunny\) Jiang, PhD](#)

Jiang's research focus is in coastal water quality microbiology and the application of molecular techniques to detect human pathogenic bacteria and viruses in aquatic environments.

[Masashi Kitazawa, PhD](#)

Kitazawa's primary research focuses on understanding the impact of neuroinflammation on the molecular pathogenesis of Alzheimer's disease (AD). In particular, how aging and/or environmental exposure perturb physiological functions of astrocytes and microglia and disrupt inflammatory microenvironment in the brain, leading to the development and progression of the disease.

[Virginia Kimonis, MD](#)

Kimonis is a Clinical Geneticist-Scientist with a strong interest in the genetics of neuromuscular diseases. Her laboratory focuses on the genetic causes of muscle disease. She is particularly interested in inherited muscle disorders that occur in combination with diseases of bone.

[Michael T. Kleinman, PhD](#) — Co-director, Air Pollution Health Effects Laboratory
Kleinman's research focuses on the mechanisms of cardiopulmonary injury following inhalation of toxic compounds. His laboratory uses state-of-the-art methods to evaluate the roles of free radicals and oxidative stress in sensitive human volunteers and laboratory animals. In vitro methods are used to evaluate specific mechanisms. Other interests include analytical and atmospheric chemistry, environmental sampling and analysis, and the application of mathematical and statistical methods to environmental and occupational assessments of exposure and risk.

Charles E. Lambert, PhD

Lambert's interests are in industrial and regulatory toxicology, pharmaceutical toxicology as it relates to impurities and degradants, green chemistry and life cycle evaluations, risk assessment and risk communication.

[Charles L. Limoli, PhD](#)

Limoli studies the mechanisms by which cells perpetuate genomic instability in response to radiation and environmental toxicants and the role of oxidative stress in these processes. He also explores how DNA damage and oxidative stress may drive the progression of normal multipotent cells in the central nervous system to brain tumor stem cell.

[Oladele A. Ogunseitan, PhD](#) — Chair, Department of Population Health and Disease Prevention

Ogunseitan's research is focused on microbial diversity and ecology, environmental pollution, industrial ecology, health and development.

[Kathryn E. Osann, PhD](#)

Osann's specialty is in cancer epidemiology and applied biostatistics.

[Robert F. Phalen, PhD](#) — Co-director, Air Pollution Health Effects Laboratory

Phalen's research focus is on the aerodynamics of particle deposition in the developing lung and in the adult lung. Another area of interest is in the assessment of lung defense mechanisms using radio-labeled aerosol inhalation challenges. His lab uses quantitative morphometry to study the mechanism of interference with organogenesis and possible long-term consequences for chronic lung disease due to toxic inhalation exposure. Additional studies include evaluating the tolerance of animals to air pollution mixtures as a mechanism that may protect humans against ambient pollutants.

[John Leslie Redpath, PhD](#) – Professor Emeritus

[Ronald C. Shank, PhD](#) – Professor Emeritus

[Veronica Viera, PhD](#)

Vieira has an extensive knowledge of GIS, groundwater modeling, cluster detection methods, and on persistent environmental contaminants including tetrachloroethylene (PCE, a dry-cleaning solvent), perfluorooctanoic acid (PFOA, a perfluorinated compound (PFC) involved in the manufacturing of Teflon), and polybrominated diphenyl ethers (PBDEs, a common class of flame retardants). Components of her work include improving methods for geocoding rural addresses using GIS and examining the relationship between PFOA exposures and health outcomes. Vieira's research also includes method development for spatial epidemiology such as disease mapping, cluster detection, and space-time interactions.

[Jun Wu, PhD](#)

Wu's research focus is on air pollution exposure assessment and air pollution epidemiology. Recent and current studies involve human exposure assessment

(measurement and modeling), applications of geographical information system (GIS) and global positioning system (GPS) tracking in exposure assessment and epidemiological studies, and impacts of air pollution exposure on pregnancy outcomes and respiratory illnesses.

X. FREQUENTLY USED NUMBERS AND ADDRESSES

Graduate Division, 120 Aldrich Hall. Ext. 44611

<http://www.grad.uci.edu/>

Graduate Division Forms

<http://www.grad.uci.edu/forms/index.php>

Office of the Registrar, 215 Aldrich Hall. Ext. 47896

<http://www.reg.uci.edu/>

Ulrike Luderer, M.D., Ph.D., Director, Environmental Health Sciences Graduate Program

Center for Occupational and Environmental Health (COEH),

100 Theory Drive, Suite 100. Phone: 949-824-8081, uluderer@uci.edu

Armando Villalpando, Graduate Program Coordinator, Medical Education Building, Room 3109.

Phone: 949-824-8848; 949-824-9013, afvillal@uci.edu

Campus mail code (ZOT code): 1830

Program/Department Fax number – 949-824-2345 (at the COEH)

XI. IMPORTANT FILING DEADLINES

FINAL DEGREE PAPERWORK

Summer 2017	September 13, 2017
Fall 2017	December 8, 2017
Winter 2018	March 16, 2018
Spring 2018	June 8, 2018
Summer 2018	September 12, 2018

*** NO EXCEPTIONS ALLOWED**

ADVANCEMENT DEADLINES – MASTER'S

Summer 2017	September 22, 2017
Fall 2017	December 15, 2017
Winter 2018	March 23, 2018
Spring 2018	June 15, 2018

ADVANCEMENT DEADLINES – DOCTORAL

Summer 2017	September 22, 2017
Fall 2017	December 15, 2017
Winter 2018	March 23, 2018
Spring 2018	June 15, 2018

949-824-1244; alanders@uci.edu

Updated filing deadlines can be found at the following link:
<http://www.grad.uci.edu/academics/filing-deadlines.php>