Preliminary Examination Guidelines
Environmental Engineering

The Preliminary Examination is an important milestone for Ph.D. students. The exam will be administered in the fall and spring quarters of each academic year. Students must register for the Preliminary Examination by completing and submitting the required form (attached at the end of this document) to the graduate coordinator (April Heath) at least four weeks prior to the beginning of the examination period.

Purpose:
The Preliminary Examination establishes whether the Ph.D. candidate understands sufficiently well (1) major elements of Environmental Engineering (water, air quality and energy), and (2) important fundamental material and concepts necessary to conduct scholarly research in Environmental Engineering. In addition, the candidate must show the ability to synthesize different elements of knowledge to solve open-ended problems and exhibit a capability for sound scientific scrutiny and judgment. The Preliminary Examination cannot be taken before the student has clearly established a mutual agreement with a research advisor for the candidate’s doctoral work and the candidate has demonstrated proficiency in oral English (required for students who are not native English speakers).

Format:
The Preliminary Examination has two parts. Part I is a comprehensive written (90 minutes) and oral (60 minutes) examination that addresses three major elements of Environmental Engineering: water, air quality and energy. Part II is a 60-minute oral examination that addresses the critical review of an archival publication provided to the student three weeks before the examination.

Registration:
The student, together with the research advisor, must petition to the Director of the Environmental Engineering Program for the Preliminary Examination at least four weeks prior to the start of the examination period. Students who are not native English speakers must meet the requirements for “Demonstration of Oral English Proficiency for Teaching Assistant Employment” as described in the UCI catalogue before petitioning for the Preliminary Examination. Petition forms are available at the end of this document.

Examination Committee:
The Environmental Engineering Program Director appoints the Examination Committee, comprised of three core examiners (including the committee chair) and one backup examiner for a term of one academic year. The examination committee will be comprised of Environmental Engineering program faculty and represent the three major areas of Environmental Engineering: water, air quality, and energy. The faculty advisor of the candidate shall not be present at the examination.

Grading:
Each part of the exam will receive a separate “pass” or “not pass” grade from the Examination Committee. Any portion not passed must be retaken. If any portion is failed twice, the student has failed the Preliminary Examination and may not continue for the Ph.D. degree. To pass the preliminary examination, the student must have the unanimous passing vote of the Examination Committee.
Dates:
The Preliminary Examination is offered in the fall and spring quarters of each year. For those who do not pass one or both parts of the examination, the examination can be taken the second time within a one-year period.
Part I: Comprehensive Examination

OBJECTIVE:
To test the ability of the candidate to understand and relate the fundamental scientific and engineering concepts and issues associated with water, air quality and energy.

FORMAT:
Duration: 90-minute written examination followed by 60-minute oral examination

Number of examiners: A total of three, not including the faculty advisor, and representing the three major elements of Environmental Engineering: water, air quality and energy.

GUIDELINES FOR EXAMINERS AND STUDENTS:
For the written portion of Part I of the examination, the student should be prepared to provide detailed written answers to questions posed in the major areas of Environmental Engineering. For the oral portion of Part I of the examination, the candidate should be prepared to stand before the examination committee and use, as needed, a white board to answer the questions posed by members of the committee. The candidate will be evaluated on effective communication, ability to think critically “on the spot” and overall problem-solving skills. The candidate is expected to understand the derivations and assumptions of all the fundamental science and engineering associated with the three areas, with particular competency in the area of specialization. The textbook “Environmental Engineering Science” by Nazaroff, William W., Alvarez-Cohen, Lisa, ISBN-13: 9780471144946 may be used as a reference.

Evaluation: The candidate passes Part I of the Preliminary Exam by a unanimous vote of the Examination Committee.
Part II: Publication Review

OBJECTIVE:
To test the ability of the candidate to understand, analyze, and critique a major scholarly publication in Environmental Engineering.

FORMAT:
Duration: 60-minute oral exam

Number of examiners: A total of three, not including the faculty advisor, and representing the three major elements of Environmental Engineering: water, air quality and energy.

GUIDELINES FOR EXAMINERS AND STUDENTS:
The faculty advisor, in consultation with the examiners, will provide an archival journal publication to the student at least three weeks prior to the examination. The publication should be carefully selected to meet the objective stated above. It should have at least 25 formal citations in the archival literature and is less than 5 years old at the time of examination. Exception to the citations number can be made to a recent publication of 1-2 years old. In addition, none of the authors of the publication should be current or former members of the candidate’s research group. The student is required to begin the examination with a short presentation, using up to 15 slides to present his/her understanding of the selected paper. The majority of the exam time will be spent in an interactive mode with the examiners.

The candidate should describe the research objective, why it is important, why it is novel with respect to previous research, the precise formulation of the problem being addressed, the solution approach, the results and the conclusions. The student should critically evaluate the research and suggest possible improvements and extensions of the work. The performance will be evaluated on the ability to understand, synthesize and integrate the ideas of the publication. In addition, the candidate will be evaluated on effective communication, ability to think critically “on the spot” and overall problem-solving skills. The candidate is expected to understand the derivations and assumptions of all the fundamental science and engineering supporting the publication and in addition to have some familiarity with the key references associated with the publication.

Evaluation: The candidate passes Part II of the Preliminary Exam by unanimous vote of the Examination Committee.
Ph.D. Preliminary Examination Registration Form

Environmental Engineering
The Henry Samueli School of Engineering
University of California, Irvine

Submit this form to April Heath at least four weeks prior to the start of the examination period.

To be Completed by the Student

<table>
<thead>
<tr>
<th>Last name:</th>
<th>First name:</th>
<th>Faculty Advisor:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Home phone:</th>
<th>Office phone:</th>
<th>Email:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall GPA (attach transcript):</th>
<th>GPA in non-research courses:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For non-native English speakers (Foreign students only):*
Have you met the requirements for “Demonstration of Oral English Proficiency for Teaching Assistant Employment” as described in the UCI catalogue? □ Yes □ No N/A
If yes, please explain how and if applicable, please provide the date you passed the UCI TA language exam.

To be Completed by the Advisor

<table>
<thead>
<tr>
<th>In your opinion, is the student’s breadth of knowledge and command of oral English sufficient to undergo the Preliminary Examination?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

Signature of the Candidate_______________________________________ Date: _______________

Faculty Advisor Signature_______________________________________ Date: _______________