Agenda
Graduate Council
Thursday, November 20, 2014
9:10 - 11:00 am
Academic Senate Conference Room
Room 220 University Office Building

Action
9:10 – 9:15 1. Consent Calendar
   A. Approve Agenda for November 20, 2014 and Minutes of October 16, 2014

Information/Discussion
9:15 – 9:25 2. Announcements
   A. Chair of the Graduate Council
   B. CCGA Representative
   C. Graduate Student Council Representative
   D. Dean of the Graduate Division

Action
9:55 – 10:05 3. Courses and Programs Subcommittee
   A. Approval of Program Changes:
      1. Computer Science & Engineering – renumbering CS 272 to CS 227
      2. Geological Sciences – change in Ph.D. program requirements – 2 year deadline for Ph.D. students to satisfy course requirements and pass all written and oral qualifying exams.
      3. Statistics – change to M.S. Course Work & Degree Requirements
      4. Statistics – change to Ph.D. Course Requirements
      5. Response from Prof. Vafai regarding MSOL admission assessment discussed at 10/16 GC meeting.

Discussion/Action
10:05 – 10:15 4. Online MS in Engineering - special request/exception for admissions to include all quarters
   Action: Review and vote to approve.

10:15 – 10:20 5. Computer Science - request to permanently close admissions period for Winter and Spring
   Action: Review and vote to approve.

10:20 – 10:40 6. Graduate Program Reviews
   A. Geological Sciences – Program’s response to F&R with attachments.
      Action: Vote to close review.

   B. Chemistry – Program’s response to F&R with attachments.
      Action: Vote to close review.

Discussion
10:40 – 11:00 C. Appearance of conflict of interest – reviewers and the program, what is and should be allowed?
The following courses were approved by the Courses & Programs Subcommittee and approved electronically by the full Graduate Council:

1. CPLT 293 (E-Z) (CHANGE) - Research Topics in Comparative Literature & Foreign Languages
2. CS 227 (CHANGE)* - Probabilistic Models for Artificial Intelligence
3. EDUC 255D (NEW) - Advanced Child Behavior Therapy
4. ETST 243G (NEW) - Special Topics in Ethnic Studies

*Courses are related to a program change on the agenda
Present:
David Lo, Chair, School of Medicine
Tom Payne, Vice Chair, Computer Science & Engineering
Wendy Ashmore, Secretary, Anthropology
Alicia Arrizon, Gender & Sexuality Studies
Malcolm Baker, Art History
Michael Coffey, Plant Pathology & Microbiology
Ryan Julian, Chemistry
John Kim, CCGA Rep., Comparative Literature & Foreign Languages
Chris Laursen, Political Science
Rene Lysloff, C&P Chair, Music
Rollanda O’Connor, GSOE
Rick Redak, Fellowships Chair, Entomology
Amit Roy Chowdhury, Electrical Engineering
Jorge Silva-Risso, SoBA

Absent:
Ted Garland, Jr., Biology
Joe Childers, Graduate Dean (ex-officio)

Guests:
Linda Scott, Graduate Division

Approval of Minutes
The minutes from the September 25, 2014 meeting were unanimously approved as written.

Chair’s Announcements
Chair Lo informed the Council that he attended the Academic Senate Chair’s Retreat. The other Senate Chairs were impressed with the Council’s attendance policy and will likely use it as a model if their committees wish to adopt a similar policy. Chair Lo shared issues that were discussed at the Executive Council meeting following the Retreat. The first issue discussed involved the naming of a conference room. The Academic Senate is asked to comment on naming of buildings and conference rooms. It was mentioned that these issues should be handled by a naming committee. The second issue had to do with the Committee on Educational Policy (CEP) proposing oversight committees for summer session. One of these oversight committees looked at academic policy (courses) and the other committee was administrative, addressing enrollment and related issues. The Senate wanted an overlap of representation on both committees. There was concern that the Senate wanted additional meetings and reports. CEP decided not to go with the Senate’s recommendation indicating they could not take on this additional task with their already overburdened workload. The last issue Chair Lo shared from the Executive Council meeting had to do with student initiated courses. These two unit courses would be proposed by undergraduate students with a faculty advisor that would help guide the
development of the course. There would be a limit on the number of these courses that could be proposed. Some of these types of courses have already been taught at UCR.

Chair Lo informed the Council that program review subcommittees recently had pre-meetings with programs undergoing a review this academic year. The meetings went well and he was impressed with how far along programs are with the completion of their review documents. Programs appreciated the discussions and advice they received from the subcommittees. The Management subcommittee learned that SoBA recently received accreditation. The program also wants to expand to include Marketing so this review is taking place at a good time for them. The reorganization of CNAS was discussed during the Statistics pre-meeting.

Chair Lo indicated that the Senate has received complaints about the amount of time it takes to approve courses the Council returns to programs for corrections or clarification. A possible solution is to have the C&P Subcommittee be the final approving body of courses. This would make Graduate Council only responsible for the final review and approval of program changes. Several members expressed interest in reviewing the new and revised courses. It was proposed that the Graduate Council review the courses electronically and vote to approve them by email prior to the Graduate Council meeting. This review and approval would take place the week following the C&P Subcommittee meeting where the courses are approved. Any courses that are returned to programs by C&P can be reviewed and approved electronically by C&P, followed by electronic review and final approval from Graduate Council. Sarah will send the C&P agenda to Graduate Council immediately following the subcommittee’s meeting. The agenda will indicate if the course was approved or returned by the subcommittee. The Council voted in favor of this new procedure.

Other Announcements

Graduate Dean Joe Childers – Dean Childers was not in attendance.

CCGA Representative, John Kim – Professor Kim had no announcements.

Courses and Programs

Graduate Council voted to approve/return the following courses as indicated:

1. ANTH 200A* (CHANGE) - Core Theory in Anthropology – approved.
2. ANTH 200B* (CHANGE) – Core Theory in Anthropology – approved.
3. ANTH 200C* (DELETE) - Core Theory in Anthropology – approved.
4. BCH 209/CMDB 209/GEN 209 (NEW) - Ribonucleic Acid (RNA) Biology – approved.
5. BPSC 234 (CHANGE)/GEN 234 (NEW) – Statistical Genomics – approved.
6. HIST 250 (DELETE) - New Directions in Historical Research – approved.
8. MUS 293 (CHANGE) – Composition Practicum – approved.

*Courses are related to a program change on the agenda
Graduate Council voted to approve/return the following program changes as indicated:

1. **SoBA/MFin** – Proposed change to curriculum – *approved.*
2. **SEAS** – Change in description of concurrent PhD enrollment and length of Master’s thesis – *approved.*
3. **BCOE Online Master of Science in Engineering** – Admission assessment – C&P wanted the full Council to discuss this proposal. The committee was concerned that the proposed admission policy would allow admission to anyone with six years of full-time job experience regardless of any higher education as there is no requirement for an undergraduate degree. The Council also felt that parts of the proposal were very vague, specifically the A-F criteria. It was hard to detect what exactly students must have for admission. The Council agreed that a bachelor’s degree should be a minimum requirement for admission. The Council voted in favor of returning the proposal to the program requesting that they reconsider their minimum admission requirements to at least include a bachelor’s degree and completion of the Engineering exam. The Council will also request that the program provide comparisons to similar graduate programs with the same admission requirements.
4. **Computer Engineering** – Adding courses students can take in Computer Science or Electrical Engineering to satisfy technical elective unit requirement – *approved.*
5. **SoBA/Flex MBA** – Change in course requirements so program is in line with full-time MBA requirements – *approved.*
6. **Anthropology** - Proposed changes to Doctoral degree – *approved.*

**Graduate Council Grade Appeal Form**
The Graduate Council reviewed and approved the Grade Appeal Form pending revisions from the Graduate Division.

**Graduate Program Reviews**

**Environmental Sciences Task Force Report** – Graduate Council voted to close out the review of the Environmental Sciences program and forward the task force report to the program and Dean Yates.

**MS in Global Health**
Chair Lo provided the Council with the background on the thought for a systemwide program on Global Health. Committee members were concerned with One Health’s relationship to this proposal. The committee noted that the courses had no units or assigned instructors. The Council questioned whether the listed participating faculty were aware that they were part of this program as the proposal lacked commitment letters from participating faculty. The Council agreed that the courses need to be in CRAMS so that a simultaneous review of the courses and the proposal can occur. It was agreed that the proposal was too preliminary to give a thorough review.
October 9, 2014

TO: Dr. Lynda Bell  
   Chair, Graduate Council

FR: Dr. Marek Chrobak  
    Computer Science & Engineering

RE: Requested Catalog Updates for 2015-16

Dear Dr. Bell:

The attached requested catalog change was voted on and approved by the Computer Science faculty. As the 270 series within Computer Science is designed for special topics courses, CS 272 is no longer appropriately numbered. We are renumbering CS 272 to CS 227.

Thank you.
PROPOSED CHANGE TO COMPUTER SCIENCE GRADUATE REQUIREMENTS

PRESENT:

Graduate Program
The Department of Computer Science and Engineering offers the M.S. and Ph.D. degrees in Computer Science. General requirements are listed in the Graduate Studies section of this catalog. Specific requirements for each degree are described below. Students enrolled prior to Fall 2008 can still follow the old Graduate Program.

Admission
All applicants must supply GRE General Test scores. The GRE subject test in Computer Science is recommended but not required. Applicants should have at least an undergraduate degree in computer science or a closely related field, but applicants who fail to meet this criterion may sometimes be admitted with deficiencies.

Prerequisite Material
Competence in the areas defined by the following UCR courses is essential to graduate study in computer science:
CS 141, CS 150, CS 152, CS 153, CS 161

A student who is deficient in any of these competency areas may be asked to complete the corresponding UCR course with a letter grade of at least B+, or to pass a challenge examination based on that course’s final exam with a grade of at least B+. All such remedial work should be completed within the first year of graduate study, and in all cases the deficiency must be corrected before a student can enroll in any graduate course from the same specialty area.

Core Areas
Students have considerable flexibility in selecting specialty area(s) within the program.

PROPOSED:

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Core Areas
Students have considerable flexibility in selecting specialty area(s) within the program.
However, the following core areas introduce fundamental concepts and tools of general interest to all students.
1. Hardware design principles: CS 203 or CS 220.
2. Theoretical foundations: CS 215 or CS 218.

**Major Specialty Areas** The department has active research programs in the following major specialty areas. A list of related graduate courses is provided for each area. Courses that qualify for the M.S. Breadth Requirement are marked with an asterisk (*).

C. Databases, Data Mining, and Machine Learning: CS 205*, CS 235*, CS 229, CS 236*, CS 272
E. Computer Networks: CS 204*, CS 237, CS 239*, CS 240, CS 257, CS 255*
F. Programming Languages, Compilers, and Software Engineering: CS 201*, CS 206*, CS 207*, CS 245*, CS 246*

**Master’s Degree**
The Department of Computer Science and Engineering offers the M.S. degree in Computer Science, after completion of the following degree requirements.

**Satisfactory completion** of CS 287 (Colloquium in Computer Science) each quarter of enrollment for full-time in-residence graduate students.

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C. Databases, Information Retrieval, Data Mining, and Machine Learning: CS 205*, CS 227, CS 229, CS 235*, CS 236*, CS 242*
E. Computer Networks: CS 204*, CS 237, CS 239*, CS 240, CS 255*, CS 257
F. Programming Languages, Compilers, and Software Engineering: CS 201*, CS 206*, CS 207*, CS 245*, CS 246*

**Master’s Degree**
The Department of Computer Science and Engineering offers the M.S. degree in Computer Science, after completion of the following degree requirements.

**Satisfactory completion** of CS 287 (Colloquium in Computer Science) each quarter of enrollment for full-time in-residence graduate students.
Course Requirements 48 quarter units of graduate or upper-division undergraduate courses are required. Students who have completed similar courses elsewhere may petition for a waiver of a required course or for substitution of an alternative course. For students interested in interdisciplinary research, individual study programs can be approved. All courses used to satisfy these requirements (with the exception of CS 297 and CS 299) must be taken for a letter grade. No course can be counted towards more than one category.

1. Core Requirement (8 units). Choose one course from two of the three Core Areas listed above, with no grade lower than B-.

2. Breadth Requirement (8 units). Two approved breadth courses chosen in such a way that together the core and breadth courses cover four different Major Specialty Areas (A to G).

3. Electives (32 units)
   a. Comprehensive Examination Option. A student pursuing the M.S. degree, comprehensive examination option, the 32 elective units must include at least 16 units must be approved graduate lecture courses. The remaining 16 units may include additional approved graduate lecture courses, up to 8 units of graduate seminars in CS 260–269, and up to 12 units of approved undergraduate technical electives.
   b. Project Option. A student pursuing the M.S. degree, non-thesis option, may include up to 4 units of Directed Research (CS 297) towards the elective requirement. Of the remaining 28 units, at least 12 units must be approved graduate lecture courses. The remaining 16 units may include additional approved graduate lecture courses, up to 8 units of graduate seminars in CS 260–269, and up to 12 units of approved undergraduate technical electives.
c. **Thesis Option.** A student pursuing the M.S. degree, thesis option, may include up to 12 units of graduate research (CS 297 or CS 299) towards the elective unit requirement. Of the remaining 20 units, at least 4 units must be approved graduate lecture courses. The remaining 16 units may include additional approved graduate lecture courses, up to 8 units of graduate seminars in CS 260–269, and up to 8 units of approved undergraduate technical electives.

**Capstone Experience** All students must complete a capstone experience that synthesizes and integrates the knowledge and skills obtained throughout the master’s program, according to one of the following options. The Comprehensive Examination Option is the default option to obtain the M.S. degree. If a student chooses the project or thesis option, it is the responsibility of the student to find a faculty member willing to supervise the master’s project or thesis, to form the faculty examining committee, and to schedule the oral examination.

a. **Comprehensive Examination Option** Students must pass a comprehensive examination administered by the Department of Computer Science and Engineering.

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Combined B.S. + M.S. Five-Year Program

The department offers a combined five-year B.S.+ M.S. program, designed to allow successful UCR Computer Science B.S. graduates to complete the Master of Science degree in Computer Science in one year, by allowing up to 12 credits of coursework taken as a UCR undergraduate to be counted towards the 32-unit elective requirements of the M.S. (The courses that can be double-counted are those that are eligible to be counted as technical electives in the B.S. requirements.) A student may apply at the start of their senior year by submitting an application to the Computer Science M.S. program, provided that at the end of junior year, the student was a UCR CS B.S. student with cumulative GPA at least 3.4 and had completed the following courses with no grade less than a B- and average grade at least 3.2: CS 100, CS 120A, CS 120B, CS 161. The application to the M.S. program must include at least two recommendation letters from UCR Academic Senate faculty members (at least one, and preferably both, CSE faculty). Submission of GRE scores with the application is recommended but not required. Matriculation into the combined program occurs in the Fall term following senior year, provided: (a) the M.S. application is accepted, (b) throughout senior year, the student is a CS B.S. major with cumulative GPA 3.4 or higher, (c) by the end of senior year, the student completes the Computer Science B.S. degree requirements.

Incoming students who are applying to the CS B.S. program may simultaneously apply for preliminary admission into the combined program provided their high-school GPA is at least 3.6, their SAT-I combined score is at least 1950, they satisfy the Entry-Level Writing requirement before matriculation, and they have sufficient math preparation to enroll in calculus upon arrival.

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Preliminary admission status is maintained as long as the student is a Computer Science or Computer Engineering B.S. student in good standing with a cumulative GPA of at least 3.4. Preliminarily admitted students still need to apply for full admission in their senior year as described above.

Five-year programs leading to M.S. degrees in other programs (including Computer Engineering) are also available. They are described separately in the catalog sections for those programs.

Doctoral Degree
The Department of Computer Science and Engineering offers the Ph.D. degree in Computer Science, after completion of the following degree requirements. It provides a research-oriented education in preparation for a career in research, industry, or academia and exploring both the fundamental aspects of computer science and engineering as well as their applications.

Satisfactory completion of CS 287 (Colloquium in Computer Science) each quarter of enrollment for full-time in-residence graduate students.

Course Work
The course requirements for the Ph.D. degree ensure that Ph.D. students are exposed to fundamental concepts and tools (core requirement), a deep up-to-date view of their research specialty area (depth requirement), and an advanced, up-to-date view of the same topics outside their area (breadth requirement). Students are expected to complete all of these course requirements in the first two years of the program. These requirements consist of 44 quarter units of approved graduate or upper-division undergraduate courses, satisfying all four of the following course work categories.
All of these courses must be taken for a letter grade, and no course can be counted towards more than one category. Students who have completed similar courses elsewhere may petition for a waiver of a required course or for substitution of an alternative course. Units obtained in CS 270, CS 287, CS 290, CS 297, CS 298, CS 299, CS 301, and CS 302 cannot be counted in any course work category.

1. **Core Requirement (12 units).** Choose three courses from at least two of the three Core Areas described above, with no grade lower than B- and an overall core course GPA of at least 3.2.

2. **Depth Requirement (8 units).** Choose two courses listed above under the same Major Area (A to G). This requirement ensures that Ph.D. students, early on in their careers, acquire some depth of knowledge in a particular research area. It provides a research-oriented education in preparation for a career in research, industry, or academia and exploring both the fundamental aspects of computer science and engineering as well as their applications.

3. **Breadth Requirement (12 units).** Choose three courses from at least two different Major Areas (A to G) outside the student’s depth area. No course that is listed in the student’s depth area can be used to fulfill the breadth requirement, even if it is cross-listed in another area. Students, with the consent of the major professor, may petition for a non-CSE course to be counted towards the breadth requirement.

4. **Electives (12 units).** The remaining courses can be selected from additional CS graduate lecture courses, up to 8 units of graduate seminars in CS 260-269, and up to 8 units of approved undergraduate technical electives. Students, with the consent of the major professor, may petition for a non-CSE course to be counted as an elective.
Milestones The Department has established three milestones to mark progress towards the Ph.D. degree in Computer Science: advancement to candidacy, presentation of the dissertation proposal, and final oral examination. A Ph.D. student must also satisfy all applicable Graduate Division requirements for each milestone.

Milestone 1: Advancement to Candidacy. A student advances to candidacy after he/she has completed all of the Ph.D. course requirements described above, and passed the combined written and oral qualifying examinations, as described below. These two exams are intended to verify three components of the student’s preparation for Ph.D. research: (1) breadth of comprehension sufficient to enable Computer Science research in areas beyond the topic(s) of the research exam and dissertation; (2) ability to perform critical study, analysis and writing in a focused area; and (3) demonstrated research experience or ability to do research.

Written Qualifying Examination The written qualifying examination consists of a written report summarizing the oral presentation to be given at the oral qualifying examination. This report must be written in proper technical English and in the style of a typical Computer Science conference or journal publication, and must be submitted to the Qualifying Committee for approval at least one week prior to the oral qualifying examination.

Oral Qualifying Examination The student is expected to demonstrate research aptitude by undertaking a research study on some topic (typically a problem from student’s chosen research specialty that may be a promising area in which to conduct the dissertation research),
under the guidance of his or her faculty major professor. The research must be presented orally to a Qualifying Committee, which is appointed by the Graduate Division based on nominations from the department. The committee will consist of at least four Senate faculty members, with at least three members whose home department is CSE. The committee evaluates the merits of the work and the student’s aptitude for research. The work must represent significant progress towards original and publishable research. This report must be written in proper technical English and in the style of a typical Computer Science conference or journal publication. The student must complete this requirement in no more than two attempts. The normative time for taking the Oral Qualifying Exam is by the end of the fifth quarter.

Dissertation Committee After advancing to candidacy, the student must form a Doctoral Examination Committee chaired by his or her major professor. The committee will consist of at least four senate faculty members with at least three members belonging to the CSE department (their home department is CSE).

Milestone II: Dissertation Proposal Examination After advancement to candidacy, the student prepares a dissertation proposal that describes the dissertation topic, summarizes the relevant background literature, and presents a comprehensive research plan for the doctoral dissertation. The Dissertation Proposal Examination evaluates appropriateness of the research topic and the feasibility of the research plan. It also establishes a realistic timeline for the completion of the Dissertation.

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Milestone II: Dissertation Proposal Examination After advancement to candidacy, the student prepares a dissertation proposal that describes the dissertation topic, summarizes the relevant background literature, and presents a comprehensive research plan for the doctoral dissertation. The Dissertation Proposal Examination evaluates appropriateness of the research topic and the feasibility of the research plan. It also establishes a realistic timeline for the completion of the Dissertation.
The Dissertation Committee administers this exam. The normative time for the Dissertation Proposal Exam is by the end of the third year. The Dissertation Proposal exam must be taken at least six months prior to the Final Doctoral Examination.

Milestone III: Final Doctoral Examination
The student is required to write a dissertation in accordance with the Graduate Division requirements and may be required to defend it in a public oral final doctoral examination to the Dissertation Committee. After a satisfactory performance on the final doctoral examination, the Dissertation Committee recommends granting the PhD degree. The student’s research and the dissertation must both meet the highest standards of originality and scholarship. The normative time for the completion of a Ph.D. in Computer Science is five years.

Professional Development Requirement
All incoming M.S. and Ph.D. students must enroll in the Fall, Winter, and Spring offerings of CS 287, Colloquium in Computer Science.

JUSTIFICATION:
As the 270 series within Computer Science is designed for special topics courses, CS 272 is no longer appropriately numbered (renumbering CS 272 to CS 227). There are also some minor format corrections included (for example, there are some corrections in the specialty areas to list the courses in sequential order).
CS 210 (area G) and CS 211 (area D) are two new courses and we have identified the appropriate specialty area for them to belong to. They, along with CS 242 (area C) have been continually petitioned as breadth courses for both the M.S. and Ph.D. so now we have listed them officially as such in their respective areas, also causing the need to rename those specialty areas so they fit.

APPROVALS:
Computer Science and Engineering Department: 10/8/2014
Coversheet for Request for Approval  
To Modify Graduate Program Degree Requirements

<table>
<thead>
<tr>
<th>Program</th>
<th>Geological Sciences Graduate Program</th>
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<tbody>
<tr>
<td>Is this an interdepartmental program?</td>
<td>☐ Yes    ☒ No</td>
</tr>
<tr>
<td>If an interdepartmental program, list other involved programs</td>
<td></td>
</tr>
<tr>
<td>Department/Academic Unit/School</td>
<td>Geological Sciences, University of CA-Riverside</td>
</tr>
<tr>
<td>Date</td>
<td>Oct 24th, 2014</td>
</tr>
<tr>
<td>Proposed Effective Date</td>
<td>Fall 2015</td>
</tr>
</tbody>
</table>

Faculty Contact: Dr. Gordon Love  
Email: gordon.love@ucr.edu  
Phone: x23181
Prepared by: John Herring  
Email: john.herring@ucr.edu  
Phone: x22441

Proposed Modification(s) (please check all that apply)

- ☐ Admission requirements
- ☐ Unit requirements
- ☐ Professional Development Plan
- ☐ Examination requirements
- ☐ Time-to-degree

☐ Course requirements — course changes/new courses MUST be submitted in CRAMS simultaneously with program change/new program submission.

☒ Other (please describe): Advancement to candidacy

☒ Does this program change affect any other programs

1. If the program change involves changes to any existing courses (deleting courses, changing existing courses, or adding new courses), the course changes MUST be submitted in CRAMS simultaneously with the program change submission so that Graduate Council can review all affected courses with the proposed program change.

2. Proposal must include a cover letter from the Dean, Associate Dean, Chair, Director or Program Advisor as appropriate, taking care to briefly describe the proposed modifications and justification for the request.

3. Attached proposal must include the proposed modifications as formatted in the example below. The existing requirements must be on the left column, and the proposed revisions on the right. Proposed additions must be underlined and deletions must be struck.

<table>
<thead>
<tr>
<th>Existing</th>
<th>Proposed</th>
</tr>
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<tbody>
<tr>
<td>Insert existing program requirements on this side of the table and strike the deletions.</td>
<td>Insert proposed requirements on this side of the table. Underline the additions</td>
</tr>
</tbody>
</table>

Justification: The Justification should include examples such as impact on time to degree, expected impact on employment prospects, expected impact on recruitment. Please address whether current students will be permitted to switch to take advantage of the revisions. If so what will the approval process be?

Faculty Approval Date: Indicate the date of the faculty vote

Department Chair / Program Director: Please type name(s) as appropriate
Signature: Please include signature(s) as appropriate
Date: Date signed

Checklist of Required Attachments/Appendices (please check to verify inclusion):

☐ Dean/Associate Dean/Chair or Program Advisor Cover Letter.
☐ Completed Coversheet for Request for Approval To Modify Graduate Program Degree Requirements.
☐ Revised Catalogue/Website Copy in proper table format including Justification as indicated above. Must be signed and dated.
24th October, 2014

Gordon D. Love, Ph.D
Professor of Biogeochemistry
& Graduate Advisor,
Department of Earth Sciences
University of California, Riverside

To: Graduate Council,

We are requesting that you consider a proposed change of policy which affects the Ph.D. program requirements for Geological Sciences. Specifically, we would like to introduce a strict 2 year deadline for our domestic Ph.D. students to pass their candidacy exams, and the faculty in the Department of Earth Sciences voted unanimously to adopt this as a new policy at our recent faculty retreat in September.

Our adoption of a new policy of a maximum time of 2 years to pass candidacy for students in the Geological Sciences Ph.D. track will yield positive results in terms of:

i) reducing the disparity in qualifying exam deadlines that disadvantage international students (who currently have to qualify after only 4 quarters) compared with domestic students,

ii) allowing all our Ph.D. students more quality time towards making their research projects successful, including more time to write up manuscripts that can be submitted to international peer-reviewed journals.

We note that a recent positive trend is that a high proportion of our newest graduate students (both domestic and international) are fulfilling their course requirements after 3 or 4 academic quarters, so this is a realistic expectation. For example, in the 2013-14 academic year, twelve out of fourteen of our first year graduate students completed their “4 x 4” course requirements (at least four graduate- or upper level undergraduate-level instructional courses taught by four different faculty members), which is the fastest completion record of courses that we have experienced to date for an intake.

Please do not hesitate to contact me if you need any clarification regarding our proposal.

Sincerely,

Gordon Love
Present

Graduate Programs

The department of Earth Sciences offers the M.S. and Ph.D. in Geological Sciences. Graduate education in the Geological Sciences emphasizes general geology combined with specialization in fields such as evolutionary paleobiology, invertebrate and vertebrate paleontology, Quaternary geology, neotectonics, applied geophysics, geotectonics, crustal processes, geochemistry, groundwater, mineral deposits, stratigraphy, sedimentology, sedimentary geochemistry, basin analysis, landscape ecology, fire ecology, and natural resource conservation. Integrated field and laboratory studies are encouraged.

Admission

An undergraduate degree in geology or geophysics is the normal preparation for graduate work; however, a degree from a related field of science or engineering is often appropriate. Applicants to graduate status must supply GRE General Test (verbal, quantitative, analytical) scores before admission.

Master’s Degree

In addition to the general requirements listed under the Graduate Studies section of this catalog, the requirements for the M.S. degree in Geological Sciences, under the Plan 1 (Thesis), are as follows.

Admission

Students must make up any deficiency in preparation. The background required is course preparation equivalent to the bachelor’s degree in Geology or Geophysics at UCR. Courses taken to remedy background deficiencies are not applicable to the graduate degree. Such courses are designated in the letter of admission to the program sent by the dean of the Graduate Division to the student.

Proposed

(No change)
Biannual Reviews All students must undergo biannual reviews by the departmental Graduate Progress Committee. A student’s progress is assessed in these reviews, and the committee may recommend changes in a student’s plans after these reviews.

Course Work All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students must attend the weekly Hewett Club lecture series. Students must complete a minimum of 36 units of course work in the major and related subjects and obtain advance approval of a coherent plan of study from the graduate advisor.

A maximum of 12 upper-division units beyond the requirements for the bachelor’s degree may be applied to the 36-unit requirement.

Students must complete a minimum of 12 units of graduate courses, which must include at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor.

Subject to the approval of the graduate advisor, a limited number of upper-division courses in the major and related sciences, if not required for the bachelor’s degree and not taken previously, may be accepted for graduate credit.

Thesis and Final Oral Examination Before the end of the third quarter of study and before embarking on research, the student must submit a written thesis proposal to the graduate progress committee. After approval of the proposal, the student must submit a thesis based on original work for approval by a thesis committee. A maximum of 12 units of thesis research may be counted toward the 36-unit minimum.
Students present an open research seminar as a final oral examination, which is advertised to all the students and faculty in the Earth Sciences Department.

**Normative Time to Degree** 7 quarters

**Global Climate and Environmental Change (GCEC)** The GCEC MS track is a field and laboratory based multidisciplinary program focused on the evidence for and controls of past and present climate change. Candidates must complete the following:

**Course Work** Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses, and research credit from 1 and 2 (below). Other upper-division undergraduate and graduate classes outside may be substituted with consent of the Graduate Advisor. 24 of 36 credits must be graduate level.

1) Required Core courses: GEO 224 upon entry into the program, GEO 260 and BIOL 212/ENTM 212/GEO 212.

2) At least two additional disciplinary courses: GEO 221, GEO 226, GEO 239, GEO 249, GEO 251, GEO 255, GEO 264, GEO 265, GEO 268, GEO 301, OR ENSC 200, ENSC 218, ENSC 224, ENSC 225, ENSC 232.

**Thesis Work** Before the end of the third quarter students must nominate a faculty advisor and identify a thesis topic. Before embarking on research the student must submit a thesis proposal based on original work for approval by a thesis committee. A maximum of 8 units of research credit can be counted toward the 36 unit minimum. Students present an open research seminar as a final oral examination.

**Doctoral Degree**

The Department of Earth Sciences offers the
Ph.D. in Geological Sciences. In addition to the general university requirements of the Graduate Division as found in the Graduate Studies section of this catalog, the Ph.D. in Geological Sciences normally requires the following.

**Biannual Reviews** All students meet with the Graduate Progress Committee during their first week at UCR to discuss general interests, goals, and plans. The committee recommends courses designed to prepare a student for research and to correct deficiencies in background. This committee also reviews a student’s progress biannually and may recommend transfer to the master’s program if normal progress is not maintained.

**Course Work** Students must complete at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor. Course work used in satisfaction of the M.S. degree may be accepted with the graduate advisor’s approval. All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students are also required to attend the weekly Hewett Club lecture series.

**Written and Oral Qualifying Examinations**
Students must write two research proposals. The proposal topics must be approved by an examination committee to ensure breadth. The committee reviews the proposals and, if acceptable, recommends proceeding to the oral qualifying examination. An oral examination committee appointed by the dean of the Graduate Division examines the adequacy of the student’s preparation to conduct the proposed research. Advancement to candidacy in the Ph.D. program follows successful completion of the oral examination.

Written and Oral Qualifying Examinations
Students must write two research proposals. The proposal topics must be approved by an examination committee to ensure breadth. The committee reviews the proposals and, if acceptable, recommends proceeding to the oral qualifying examination. An oral examination committee appointed by the dean of the Graduate Division examines the adequacy of the student’s preparation to conduct the proposed research. Advancement to candidacy in the Ph.D. program follows successful completion of the oral examination.

All Ph.D. candidates must satisfy the course requirements and have passed their written and oral qualifying exams within two years of entering the program, otherwise they will not be eligible to continue in the Ph.D. track.
Dissertation and Final Oral Examination  
A dissertation normally evolves from one of the research proposals. The dissertation must present original scholarly work and be approved by a dissertation committee before the student may take the final oral examination. Students must have satisfactory performance on the final oral examination given by the dissertation committee. Major emphasis in this examination is on the dissertation and related topics.

Normative Time to Degree from the B.S.  
17 quarters

Faculty approval Date:  Sept 26th, 2014

Justification:

Our adoption of a new policy of a maximum time of 2 years to pass candidacy for students in the Geological Sciences Ph.D. track will yield positive results in terms of:

i) Reducing the disparity in qualifying exam deadlines that disadvantage international students (who currently have to qualify after only 4 quarters) compared with domestic students,

ii) Allowing all our Ph.D. students more quality time towards making their research projects successful, including more time to write up manuscripts that can be submitted to international peer-reviewed journals"
To: Dr. Lynda S. Bell, Chair  
Graduate Council  

From: Dr. Xinping Cui, Graduate Advisor  
Statistics Graduate Program  

Re: Proposed change in the M.S. Graduate Program Effective Winter 2015.  

Dear Lynda,  

Purpose for change: The M.S. students are not required and rarely take the majority of the Math courses listed under the “Course Work” section to enter the graduate program. Therefore, we’d like to revise this paragraph and recommend the appropriate courses to prepare for the M.S. degree. Also, the graduate program does not require students to submit a program proposal in order to meet the degree requirements. We’d like to remove this statement as well. The proposed change would commence in Winter 2015.

<table>
<thead>
<tr>
<th>PRESENT:</th>
<th>PROPOSED:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s Program</td>
<td>Master’s Program</td>
</tr>
<tr>
<td>The Department of Statistics offers the M.S. degree in Statistics.</td>
<td>The Department of Statistics offers the M.S. degree in Statistics.</td>
</tr>
<tr>
<td><strong>Admission</strong> Students entering the Master’s program must have completed a bachelor’s degree with a strong background in Statistics and sufficient training in Mathematics or take STAT 160A, STAT 160B, STAT 160C, STAT 161 and STAT 170A, STAT 170B, STAT 171, covering basic areas of probability and statistics. These courses would not be counted as credit towards the master’s degree.</td>
<td><strong>Admission</strong> Students entering the Master’s program must have completed a bachelor’s degree with a strong background in Statistics and sufficient training in Mathematics or take STAT 160A, STAT 160B, STAT 160C, STAT 161 and STAT 170A, STAT 170B, STAT 171, covering basic areas of probability and statistics. These courses would not be counted as credit towards the master’s degree.</td>
</tr>
<tr>
<td>Students must also meet the other requirements for admission as specified by the Graduate Division. The program is Plan II (Comprehensive Examination) described in the Graduate Studies section of this catalog. No foreign language is required.</td>
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</tr>
<tr>
<td><strong>Course Work</strong> Graduate students in Statistics must take (or have taken) appropriate courses in Mathematics to give them the proper background for graduate work in Statistics. Important areas include Calculus (at least MATH 008B or MATH 009A, MATH 009B, MATH 009C, and MATH 010A) and Linear Algebra (at least MATH 131). Students are strongly encouraged to take at least one of</td>
<td><strong>Course Work</strong> Graduate students in Statistics must take (or have taken) appropriate courses in Mathematics to give them the proper background for graduate work in Statistics. Important areas include Calculus (at least MATH 008B or MATH 009A, MATH 009B, MATH 009C, and MATH 010A) and Linear Algebra (at least MATH 131).</td>
</tr>
</tbody>
</table>
the following: MATH 120 (Optimization), MATH 126 (Combinatorics), MATH 135A, MATH 135B (Numerical Analysis), MATH 151A, MATH 151B, MATH 151C (Advanced Calculus), MATH 165A, MATH 165B (Complex Variables), and MATH 209A, MATH 209B, MATH 209C (Real Analysis). The specific courses selected naturally depend on the research area selected by the student.

**Degree Requirements**
The program consists of a minimum of 37 approved units. These must include 1 unit of STAT 288; 12 units of STAT 201A, STAT 201B, STAT 201C; 4 units of STAT 207, and 8 units of two consecutive quarters of STAT 293 and 4 units of STAT 209A. In addition, at least 8 units must be from STAT 200A, STAT 200B, STAT 203A, STAT 203B, STAT 205, STAT 215, STAT 216A, STAT 216B, STAT 220A, STAT 220B, STAT 230, and STAT 240.

Early in the program the student submits a program proposal, which requires the approval of the M.S. advisor. The advisor also supervises the student's progress and course of study.

**Comprehensive Examination**
After completion of the required courses, the student takes a written comprehensive examination. This is generally offered twice annually, in the fall and spring quarters.

**Petition to Change Degree Objective**
Some students can petition to change their degree objective from the M.S. degree to the Ph.D. program in Applied Statistics depending on their performances in the written comprehensive exam and coursework.

Sincerely,

Xinping Cui, Graduate Advisor
Department of Statistics
October 16, 2014

To: Dr. Lynda S. Bell, Chair
Graduate Council

From: Dr. Xinping Cui, Graduate Advisor
Statistics Graduate Program

Re: Proposed change in the Ph.D. Graduate Program Effective Winter 2015

Dear Lynda,

Purpose for change: The Ph.D. students need to take STAT 293 in two consecutive quarters in order to meet course requirement. The contents of STAT 293 are different in fall and winter quarters and students have to take them consecutively to get the full scope of statistical consulting training. The MS degree had this change to STAT 293 and was approved in April to be effective fall 2014. The Ph.D. proposed change would commence in Winter 2015.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Doctoral Degree</strong></td>
<td><strong>Doctoral Degree</strong></td>
</tr>
<tr>
<td>The Department of Statistics offers the Ph.D. degree in Applied Statistics.</td>
<td>The Department of Statistics offers the Ph.D. degree in Applied Statistics.</td>
</tr>
<tr>
<td>The program emphasizes both the theory of statistics and its application to special fields of interest. In addition to courses in statistics, a student would take courses in a substantive field from which a thesis problem requiring a statistical approach should arise. The substantive field may be chosen from areas such as biology, economics, political science, psychology or administration. Specialties might include, for example, population genetics, biological control, hydrology, epidemiology, geology, discrimination in learning, or scales and measurements.</td>
<td>The program emphasizes both the theory of statistics and its application to special fields of interest. In addition to courses in statistics, a student would take courses in a substantive field from which a thesis problem requiring a statistical approach should arise. The substantive field may be chosen from areas such as biology, economics, political science, psychology or administration. Specialties might include, for example, population genetics, biological control, hydrology, epidemiology, geology, discrimination in learning, or scales and measurements.</td>
</tr>
</tbody>
</table>

**Admission**  Students entering the program must have completed either a bachelor’s degree or a Master’s degree in Statistics, Computer Science, Mathematics, or some other quantitatively based discipline. Students lacking sufficient preparation for some statistics graduate classes must complete some preparatory work in Statistics, Computer Science, or Mathematics depending on their background. Students also have to meet the general requirements listed in the Graduate Studies section of this catalog.

**Admission**  Students entering the program must have completed either a bachelor’s degree or a Master’s degree in Statistics, Computer Science, Mathematics, or some other quantitatively based discipline. Students lacking sufficient preparation for some statistics graduate classes must complete some preparatory work in Statistics, Computer Science, or Mathematics depending on their background. Students also have to meet the general requirements listed in the Graduate Studies section of this catalog.
Change Degree Objective  Students with a Bachelor’s degree in the Ph.D. program who have satisfied all the requirements for the Master’s degree may apply for this degree while completing requirements for the Ph.D. program.

Ph.D. Course Requirements

I. Course Requirements

(A) Core: STAT 207, STAT 210A, STAT 210B, two quarters of STAT 293 and one quarter of STAT 288.

(B) 16 units of additional 200 level Statistics courses, not graded S/NC, excluding STAT 201A, STAT 201B, and STAT 201C and STAT 231A and STAT 231B.

(C) 12 units of breadth requirement: of the courses listed below, the following courses fulfill the breadth requirement: STAT 200A, STAT 203A, STAT 215, STAT 216A, STAT 220A.

(D) Substantive: Twelve units (or equivalent) in Substantive Fields with a minimum GPA of 3.00 appropriate to the student’s interest. The requirement may be waived if the student already has the background in the substantive area.

II. Teaching: At least three quarters of teaching service.

III. Miscellaneous: In preparation for the written qualifying examinations, a student can register for up to 6 units of STAT 291 (Individual Studies in Coordinated Areas) only during quarters that the student actually participates in qualifying examinations.

Foreign Language Requirement  None

Qualifying Examination  The written Part 1 & Part 2 are offered twice annually, in the fall and spring quarters. After passing the written exams the student will work with advisor to prepare for the Oral examination. Advancing to Candidacy takes place when students complete all the course requirements for the Ph.D. program and passes the written and oral exams. We expect students to complete the qualifying exams before the beginning of the third year.
Sincerely,

Xinping Cui, Graduate Advisor
Department of Statistics
November 3, 2014

TO: David Lo,
    Graduate Council

FROM: Kambiz Vafai,
      Director, MSOL Program

RE: Request to Implement Holistic Admission Criteria for MSOL

In response to your memo of October 14, 2014 please allow me to provide supplemental information regarding the purpose of the MSOL degree before addressing the Committee’s concern regarding relevant work experience, letters of recommendation, and technical competence. They are all interrelated.

To begin, it is important to understand that professional licensure is an important step for a practicing engineer to advance in her/his career. Recently, a number of engineering professional societies are recommending that a master’s degree be required for those seeking professional licensure. See http://www.usnews.com/education/best-graduate-schools/top-engineering-schools/articles/2014/03/17/mandated-masters-degrees-could-change-the-engineering-game

Thus, many of those in engineering positions will be seeking a professional, not research-based, master’s degree. The purpose of the M.S. Online Engineering (MSOL) degree is to address this need. In the U.S. News article it is stated that the proposed requirement will be a “master’s or an equivalent of 30 credits – at least half in engineering and half in other subjects including business, communications, contract law, and quality control . . .” This is exactly the curriculum associated with the MSOL program. Half of the program is dedicated to an engineering specialty and half is related to management-related topics.

Further, according to California’s Master Plan for Higher Education, professional education is one of the missions of the University of California. “UC is designated the State's primary academic research institution and is to provide undergraduate, graduate and professional education.” (emphasis-added). Thus, the MSOL program is consistent with this mission.

The most appropriate applicants for the MSOL program are those who have an engineering or science background and are working in a position with engineering responsibilities (e.g., analysis, design, economic assessment, testing, etc.). Many firms hire scientists to fill engineering positions.

For admission into the MSOL program, the program is seeking to understand qualifications in terms of technical competence first and career experience second, similar to an MBA program. The A-F admission criteria and the letters of recommendation are designed to assess both technical competence and experience.

The B.S. degree major, Fundamentals of Engineering (FE) Exam, GRE scores, undergraduate GPA, and the letters of recommendation to a limited extent form the basis for technical competence.
Although the MSOL program desires that all applicants have some engineering job experience, it recognizes that recent engineering graduates may desire to pursue the MSOL degree while entering their first position, whether it is in an engineering position or not. Thus, similar to UCR’s MBA program, there is no strict requirement for job experience to be admitted to the MSOL program. Our admission policy is consistent, with the professional MBA program that states, “Professional experience is considered advantageous but is not required for admission. We encourage recent graduates, entry-level and mid-career applicants to apply.”

The bases for judging relevant job experience will be the CV (or resumé) and the letters of recommendation. The principal criteria for assessing experience include job title and associated responsibilities within the employment experience as determined from the CV and recommendation letters. Specific items that will be judged include 1) position(s) with “engineer” in the list of job experiences and 2) job duties consistent with that of recent engineering BS graduates. Typical job duties of engineers can be found at the Occupational Outlook Handbook from the Bureau of Labor Statistics. Examples are:

Biomedical Engineers:  [http://www.bls.gov/ooh/architecture-and-engineering/biomedical-engineers.htm#tab-2](http://www.bls.gov/ooh/architecture-and-engineering/biomedical-engineers.htm#tab-2)

Environmental Engineers: [http://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm#tab-2](http://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm#tab-2)


Mechanical Engineers:  [http://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm#tab-2](http://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm#tab-2)

You will need to cut and paste the URL to access these pages directly.

Please let me know if you require further information or whether you would like us to attend one of the Committee’s meetings to address questions that may arise.

Thank you.

Sincerely,

Kambiz Vafai
Distinguished Professor of Mechanical Engineering
Director of the Online Master of Science in Engineering (MSOL) program
Bourns Hall A363
University of California, Riverside
Riverside, CA 92521
Telephone: 951-827-2135
E-mail: vafai@engr.ucr.edu
October 17, 2014

To: Prof. Kambiz Vafai, Program Director
    Online Master of Science in Engineering

From: David Lo, Chair
    Graduate Council

Re: Proposed Admission Assessment for the Online Master of Science in Engineering

The Graduate Council reviewed and discussed the proposed Admission Assessment for the Online Master of Science in Engineering. The Council found parts of the proposal to be very vague, specifically the A-F admissions criteria. It was not clear what exactly is being assessed for admission. The reliance on letters of recommendation is similarly vague, as criteria for evaluating these letters and their appropriateness for admission to the program are not explained.

While it may be appropriate to consider relevant work experience as a positive factor in admissions, it would still seem appropriate to supply some demonstration of technical competence in a degree curriculum and field that is so highly mathematics-dependent. So while the GRE and the Fundamentals of Engineering Exam might not individually be required for admissions consideration, some demonstration of technical competence would be appropriate as an indicator of the candidate's likely ability to successfully complete the course of study.

The Council was in agreement that criteria for admission to a Master's program must include at least a Bachelor's degree. Moreover, the Council would like the program to provide admissions criteria from comparable online programs (UCLA, Georgia Tech) so the Council can confirm that this model is successful at other institutions.

cc: Paul Talavera, Graduate Program Asst., Mechanical Engineering
ADMISSION ASSESSMENT FOR
BCOE ONLINE MASTER OF SCIENCE IN ENGINEERING DEGREE

The primary purpose of BCOE’s Online Master-of-Science in Engineering Program is to enable fully employed engineers and others in the technology workforce such as computer scientists, to advance their professional education, enhancing their career potential and value to their employers. In the technology sectors, the Master’s level is the degree in which students have the opportunity to learn a specialization in depth, renew and update their knowledge of technological advances, and/or gain important principles for management or entrepreneurial pursuits.

Potential students for the Online Master-of-Science in Engineering Program will come with a variety of backgrounds and experiences. For those working in a technology position, their on-the-job experience is as relevant as their undergraduate degree in terms of their readiness to enter graduate studies. For those wanting to pursue graduate studies just after graduating, test outcomes such as the GRE and the Fundamentals of Engineering (FE) exam may be strong indicators as well.

The Online Master-of-Science in Engineering Program will use a holistic approach for assessing program readiness. A Program Readiness Score (PRS) will be calculated to assess program readiness. The PRS will include the following components:

- Bachelor of Science (BS) degree in an ABET-accredited engineering or computer science degree program or Bachelor of Science (BS) degree in a natural science (e.g., chemistry, biology, physics) or mathematics from a university accredited by a regional accreditation authority.
- Fundamentals of Engineering (FE) Exam¹
- GRE test scores
- Undergraduate GPA
- Years of experience in an engineering or technology position. Experience must be related to job responsibilities associated with an engineering position and confirmed by a minimum of two reference letters from supervisory referees

The PRS (Program Readiness Score) will be calculated using this formula

\[
PRS = A + B + C + D + E + F
\]

With the following sub-scores:

- A. B.S. in engineering field from an ABET-accredited engineering degree program: \( A = 2,000 \)
- B. B.S. in natural science or mathematics from a university accredited by a regional accreditation authority: \( B = 1,000 \)
- C. Passing the Fundamentals of Engineering (FE) Exam: \( C = 2,000 \)

¹ The Fundamentals of Engineering (FE) Exam is a test developed by the National Council of Examiners for Engineering and Surveying (NCEES) and given by state licensing agencies as a first step assessment in determining the competency of a person in becoming a licensed engineer in practice. It tests understanding of general engineering science as well as specific disciplinary knowledge depending on the examinee’s engineering discipline. The passage rate for first-time FE test-takers varies from 64 to 80 percent for students who attended ABET-accredited engineering degree programs.
D. GRE Test Score: \[ D = 1,500 + [\text{GRE (V+Q)} - 300] \times 40 \]
E. GPA (major related coursework): \[ E = [(\text{GPA-3.0}) \times 1,500] \]
F. Full-time job experience in an engineering or technology position with progressive responsibilities: \[ F = 1,000 \times \text{years} \]

### MSOL ADMISSION READINESS SCORE

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Component Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bachelor of Science (BS) degree in an ABET-accredited engineering or computer science degree program.</td>
<td>2,000</td>
</tr>
<tr>
<td>B</td>
<td>Bachelor of Science (BS) degree in natural science field (e.g., chemistry, biology) or mathematics from a university accredited by a regional accreditation authority.</td>
<td>1,000</td>
</tr>
<tr>
<td>C</td>
<td>Fundamentals of Engineering (FE) Exam</td>
<td>2,000</td>
</tr>
<tr>
<td>D</td>
<td>GRE Score</td>
<td>[ 1,500 + [\text{GRE (V+Q)} - 300] \times 40 ] (Only used if taken within three years of expected admission date)</td>
</tr>
<tr>
<td>E</td>
<td>Undergraduate GPA</td>
<td>[ [(\text{GPA-3.0}) \times 1,500] ] (Only used if within three years of undergraduate degree award).</td>
</tr>
<tr>
<td>F</td>
<td>Full-time employment in an engineering or technology position based on job description. Experience must be related to job responsibilities associated with an engineering position and confirmed by a minimum of two reference letters from supervisory referees</td>
<td>1,000 for each full year of employment</td>
</tr>
</tbody>
</table>

A candidate with a minimum PRS total score of 6,000 or greater will be considered to be academically and professionally prepared to enter the program. However, the PRS will not be the sole basis for admission. The PRS in addition to the letters of recommendation will be used to make the recommendation for admission to the Graduate Division.
Example 1:
Candidate has passed FE exam, graduated with a B.S. degree in electrical engineering from an ABET-accredited program, one year of experience in an engineering position, did not take the GRE exam, GPA was 2.6.

\[
A = 2,000 \\
B = 0 \\
C = 2,000 \\
D = 0 \\
E = [(2.6-3.0) \times 1500] = -600 \\
F = 1 \times 1,000 = 1,000 \\
PRS = 4,400 \text{ (not program ready)}
\]

Example 2:
Candidate has not passed FE exam, graduated with a B.S. degree in computer engineering from an ABET-accredited program, one year of experience in an engineering position, did not take the GRE exam, GPA was 3.3.

\[
A = 2,000 \\
B = 0 \\
C = 0 \\
D = 0 \\
E = [(3.3-3.0) \times 1500] = 450 \\
F = 1 \times 1,000 = 1,000 \\
PRS = 3,450 \text{ (not program ready)}
\]

Example 3:
Candidate has not passed FE exam, graduated with a B.S. degree in mechanical engineering from an ABET-accredited program, 2 year of experience in an engineering position, GRE exam score = 310, GPA was 3.3.

\[
A = 2,000 \\
B = 0 \\
C = 0 \\
D = 1,500 + [(310-300) \times 40] = 1,900 \\
E = [(3.3-3.0) \times 1500] = 450 \\
F = 2 \times 1,000 = 2000 \\
PRS = 6,350 \text{ (program ready)}
\]

Note: This applicant would be admissible for the regular M.S. degree program as well.
Example 4:

Candidate has not passed FE exam, graduated with a B.S. degree in biology from a regionally accredited university, 4 years of experience in an engineering position, no GRE taken, GPA was 3.8.

\[
\begin{align*}
A &= 0 \\
B &= 1,000 \\
C &= 0 \\
D &= 0 \\
E &= 0 \\
F &= 4 \times 1,000 = 4,000 \\
PRS &= 5000 \text{ (not program ready)}
\end{align*}
\]

Example 5:

Candidate has not passed FE exam, graduated with a B.S. degree in sociology from a regionally accredited university, 2.5 years of experience in an engineering position, no GRE taken, GPA was 3.2.

\[
\begin{align*}
A &= 0 \\
B &= 0 \\
C &= 0 \\
D &= 0 \\
E &= (3.2 - 3.0) \times 1500 = 300 \\
F &= 2.5 \times 1,000 = 2,500 \\
PRS &= 2,800 \text{ (not program ready)}
\end{align*}
\]

Example 6:

Candidate has not passed FE exam, graduated with a B.S. degree in fine arts from a regionally accredited university, 8 years of experience in an engineering position, no GRE taken, GPA was 2.4 (completed 8 years prior).

\[
\begin{align*}
A &= 0 \\
B &= 0 \\
C &= 0 \\
D &= 0 \\
E &= 0 \\
F &= 8 \times 1,000 = 8,000 \\
PRS &= 8,000 \text{ (program ready)}
\end{align*}
\]

Note: This applicant does not receive any point for GPA since the undergraduate degree award date is not within three years.
October 10, 2014

TO: David Lo,
Graduate Council

FROM: Kambiz Vafai,
Director, MSOL Program

RE: Request to Change Admission Quarters for MSOL

As the Director of the MSOL program, I would like to formally request a change in the admissions portion of the Online Master of Science in Engineering (MSOL) program. Currently, admission into the program is open for fall quarter only. However, due to the recent upcoming partnership between the MSOL program and Pearson, Inc. it has become critical that admissions become open for all four quarters of the academic year, fall, winter, spring and summer.

Thank you for your time and prompt attention to this matter.

Sincerely,

Kambiz Vafai
Distinguished Professor of Mechanical Engineering
Director of the Online Master of Science in Engineering (MSOL) program
Bourns Hall A363
University of California, Riverside
Riverside, CA 92521
Telephone: 951-827-2135
E-mail: vafai@engr.ucr.edu
October 9, 2014

TO: Dr. Lynda Bell  
Chair, Graduate Council

FR: Dr. Marek Chrobak  
Computer Science & Engineering

RE: Graduate Application Period for Computer Science & Engineering

Dear Dr. Bell:
For many years our department has voted on a yearly basis to close admissions for the winter and spring quarters. We have a limited budget and space available for incoming graduate students each year that has consistently been filled with the fall application pool for both the M.S. and Ph.D. programs in Computer Science. Therefore, the CSE faculty voted to permanently close admission for the winter and spring quarters, and only accept applications for the fall quarter effective immediately (to affect the 15-16 academic year applications).

Thank you.
Addressing Recommendations, Findings & Questions from the Graduate Council

In reply to the Graduate Council’s findings, recommendations and queries emanating from their dissemination of the Geological Sciences Graduate Program Review report written by the External Review Team (ERT) in 2014, our responses are given in turn below.

1) Graduate Curriculum: The extramural review team notes that the migration to a more structured curriculum, begun after the last review, is still a work in progress and that “more synoptic Earth Science lecture courses that address understanding across the spectrum of fundamental Earth Science topics are not part of the curriculum.” The Department should provide a timetable for remedying this problem; or an explanation as to why that’s impossible; or an explanation as to why the current situation is not a problem (in spite of the fact that two consecutive ERTs have said that it is).

** We are pleased that the ERT recognized that we already have in place a formal set of requirements for our students to meet in order to advance to candidacy and to graduate in terms of breadth and rigor of coursework, written requirements and professional development in addition to their research component. “The present “4x4” course requirement (at least four graduate- or upper level undergraduate-level instructional courses taught by four different faculty members) for both the M.S. and Ph.D. students in the Earth Sciences Department is designed to satisfy this need while also providing flexibility to address the varying core competency requirements of different Earth Sciences subdisciplines. Geology 250 (a departmental seminar series) provides a wider scientific exposure extending across the range of departmental research topics. In addition to course requirements, the writing of two NSF-style research proposals as part of the Ph.D. candidacy process requires students to gain a firm understanding of the related scientific underpinnings of their specific subdisciplines”.

A total of 16 graduate courses are currently offered by the department at least once every 2 years, covering broad topics in paleontology, paleobiology, stratigraphy, geochemistry, climatology, biogeography and geophysics. While a combination of formal lectures and literature discussion usually form the basis of each of our graduate courses, we are striving to ensure that our 200-level classes (that are not listed as seminars) do achieve tangible goals in terms of breadth/content taught and incorporate a significant portion of principles-based instruction through lectures. Indeed, the majority (11 from 16) of our graduate courses regularly offered have a >50% time component of lectures/demonstration.

So, while we disagree with the opinion that “more synoptic Earth Science lecture courses that address understanding across the spectrum of fundamental Earth Science topics are not part of the curriculum,” since our “4x4” class requirement ensures breadth, achieving a greater component of principles-based instruction in these classes is admittedly a work in progress. We are striving towards a better balance in this regard and this will be achieved within the next two or three years as our faculty numbers increase and we continue to add principles-based courses to the catalog. Since the last graduate program review in 2006, a number of new graduate classes (GEO 242, 244, 249, 263) have been added or existing ones undergone
major revisions (GEO 257, 260), all of which include a >50% component of lectures/instruction. A new professional development course (GEO 201) that teaches research seminar and proposal writing skills is now compulsory for all of our graduate students. New faculty member, Andrey Bekker, has proposed to revamp our GEO 259 (Tectonics of California) course, which was taught previously by a faculty member who has now retired, and offer this as a broad, synoptic, and introductory Earth Sciences course that all incoming graduate students should take in Year 1.

2) **Graduate Student Support and Time to Candidacy** (the program will benefit from a thorough-going discussion with the Graduate Dean on the following issues and the outcome of that discussion should be reported back to Graduate Council as part of the response to this F&R document):

a) Graduate student who enter the M.S. program prior to entering the Ph.D. program are disadvantaged with respect to support. A remedy should be found for this situation.

** We agree that the current funding situation for graduate students entering the Ph.D. program with a M.S. degree from our department is not ideal and the students in question are disadvantaged with respect to fellowship funding. We would like to implement changes to the rules which would allow these students to obtain some fellowship money for Year 1 of their Ph.D. studies. These students would be then competing with external applicants for Ph.D. positions, which is logical and fair, but there is a long history in our department of some of our most able and successful Ph.D. graduates entering the program after graduating with a M.S. degree in Geological Sciences from UCR. They enter our Ph.D. program as known quantities.  

We recently had a meeting with Dean Childers and he is willing to introduce a more flexible funding model for our department which allows these students to obtain Ph.D. fellowship money post-Masters that makes up the deficit to the standard total package, as for external students who enter our Ph.D. program in Year 1. This might mean forfeiting some fraction of our DYP/GRMP Fellowship allocation for final year Ph.D. candidates, but we believe that providing the same funds early to M.S. students who have shown great potential for being successful Ph.D. students is a preferable option.

b) TAships and summer teaching assignments facilitate the Department’s undergraduate program, support graduate students and enhance their resumes, but they also slow progress toward the degree. Policies to balance these concerns/opportunities should be established.

** Our faculty mentors are cognizant of the need to achieve a balance between TA duties and GSR support for each of our graduate students. Our adoption of a new policy of a maximum time of 2 years to pass candidacy will result in a more uniform appropriation of TAships.
allocated, since the demands on the students to advance will be greater than in previous years. We anticipate that grad students will use a greater proportion of fellowship and GSR support prior to advancement than they currently are, in general.

Unlike many graduate programs on campus, who bring in a cohort of new students that form a general pool for the faculty to draw from as advisees, our graduate students typically contact a potential faculty advisor as part of the application process. While this association is not binding, we almost always have a putative advisor/mentor for every student who is admitted from the outset which helps their progress.

All continuing graduate students have to complete an annual online questionnaire in Spring Quarter of 2014, which reveals key information regarding their progress, achievements and future plans. The students can also request a meeting with the Graduate Advisor, with or without their faculty mentor, and if the Graduate Advisor has any concerns about progress then a meeting with the students in question is arranged at their earliest convenience. Finally, we do have some limited departmental funds in the form of the Blanchard Fellowship and funds from the Southern California Earthquake Center. These funds can be used to support graduate students (1-2 per quarter) who don’t have GSR support from their advisors, but would especially benefit from not having to be a TA. We also are actively encouraging and aiding our graduate student to avail themselves of opportunities for external grants, such as NSF Graduate Research Fellowships.

c) Campus funding policies have led to non-uniform candidacy deadlines that disadvantage international students. To fix this situation, the Department might consider setting the deadline for advancement to candidacy at the end of the sixth quarter. NRTs should be adjusted to make that possible for international students. One measure that might be adopted would be to postpone one quarter of the firstyear fellowship for the quarter of the qualifying exam.

** With respect to being able to provide a better arrangement for international students, as is the case with other departments, our hands are currently tied by our budgetary constraints and campus policy; we see no obvious way of relaxing international candidacy deadlines (without incurring an associated debilitating increase in non-resident tuition fees) without taking money from the existing pot and reducing the competitiveness of the financial packages awarded to domestic students. There does not appear to be any obvious way to solve this problem without a change of policy from the upper administration in how it deals with NRT for international students. Dean Childers informed us recently that plans are in place to directly address this issue in the near future, and that a solution will be sought regarding NRT fees which will give international students parity with domestic students. We are very optimistic that within 1-2 years we will be able to completely eliminate the inequity in the candidacy process between international and domestic graduate students.

One motion that was approved at the recent faculty retreat was to introduce a strict 2 year deadline for our domestic graduate students to pass their candidacy exams, thus reducing the
disparity in deadlines that disadvantage international students. We note that a recent positive trend is that a high proportion of our newest graduate students (both domestic and international) are fulfilling their 4 x 4 course requirements after 3 or 4 academic quarters, so this is a realistic expectation. For example, in the 2013-14 academic year, twelve out of fourteen of our first year graduate students completed their 4 x 4 course requirements, which is the fastest completion record of courses that we have experienced to date for an intake.

3) **Graduate Student Program Administration**: The Department should establish a graduate admissions committee, arrange for simultaneous campus visits by all prospective students (in so far as practical), and arrange for more speakers from agencies and the private sector.

More external speakers from agencies and the private sector will be invited to give seminars, such as through the new AAPG student chapter. In the last 12 months, we have arranged invited talks by: John Zumberge (GeoMark Research), Andy Bishop (Shell), Chad Severson (Aera Energy), Catherine Cox (Signal Hill Petroleum), Ursula Edwards (Marathon Oil) and Anne Draucker (Chevron), given to our department. This seems more than adequate, by any measures, but a tradition that we wish to continue.

We are also in the process of forming a graduate admissions committee who will help prioritize applications for admission. We will encourage our prospective students to visit campus at roughly the same time, although it will be impossible to ensure that this will work for every student. For example, we ask some students to visit prior to their acceptance into the program so that we may determine how well they will fit with our department, while we ask other students to visit after their acceptance so that we may “sell” our program to them.

4) **Administrative and Technical Staff Support**: The labs and equipment mentioned on page 19 of the eBinder (cited above) are expensive to staff and maintain. The Graduate Council concurs with the extramural review team's recommendations in terms of possible sources of funding: NSF (Earth Sciences Division Instrumentation and Facilities program) and the possibility of “taxing” grants and contracts for use of these facilities.

We are in the process of hiring new faculty, some of whom will purchase instrumentation and expand our existing analytical and computing facilities and thus hasten the need for providing technical support for these activities. The relevant faculty will meet in the coming year and discuss appropriate strategies for funding analytical/computer support. A “tax” on grants is certainly one model we will discuss, and we will also investigate the possibility of pursuing some sort of temporary seed funding from UCR for tech support.

5) **Strategic Planning and FTE Growth Management**: Establish a tradition of annual retreats for strategic planning. Particular attention should be paid to the area of Global Climate and Environmental Change (GCEC), mentioned four times in the
extramural report as an area the program is expanding as a new track for incoming students, but also as an area of curricular deficiency.

** Our first faculty retreat was held on the September 26th in 2014 in the UCR Extension Center prior to Fall quarter classes commencing. Our discussions lasted a full working day and we were able to discuss and vote on key issues concerning our graduate and undergraduate programs. The retreat was a tremendous success, and we intend to continue this activity as an annual event for the foreseeable future.

With our two recent faculty hires in Biogeochemical Climate Modeling and High Resolution Records of Cenozoic Climate and Environmental Change beginning in 2015, along with Robert Allen who is an Assistant Professor who uses climate models and Earth System observations to understand climate dynamics, we will soon be in a better position to resume activities in the Global Climate and Environmental Change (GCEC) program, which is currently in hiatus following the departure and retirements of key faculty in recent years. One possibility that we are strongly considering is expanding this program to include Ph.D. students.

6) **Department and Program Climate:** We concur in the extramural review team’s concern that the current informal structure, which has thus far promoted an excellent climate of collegiality, might not scale up as the program expands. The Department should establish more formal mechanisms that are designed to scale up as the Department grows. Furthermore, in anticipation of future growth, the Department should establish a formal structure for mentoring junior faculty.

** Starting in the Fall of 2014, the Chair has and will formally assign faculty mentors to new faculty from the outset of their appointments, lasting (at least) until the tenure process has concluded. The new faculty members will meet regularly with their mentors to discuss teaching, research and service progress and expectations. As noted above, we will have at least one faculty retreat every year so that medium- and long-term plans may be discussed and voted on by all faculty.

Overall, we believe that with the actions planned above, we will satisfy both the spirit and the letter of the ERT and Graduate Council’s suggestions for our Graduate Program. We greatly appreciate the feedback and advice we have received, and look forward to implementing these procedures.

Sincerely,

Gordon Love
Graduate Advisor,
Dept. of Earth Sciences

David Oglesby
Chair,
Dept. of Earth Sciences
August 8, 2014

David Oglesby, Chair, Geological Sciences
Gordon Love, Graduate Advisor, Geological Sciences

RE: FINDINGS AND RECOMMENDATIONS OF THE GEOLOGICAL SCIENCES GRADUATE PROGRAM REVIEW – MAY 13-14, 2014

The Findings and Recommendations of the Graduate Council resulting from the review of the Geological Sciences Graduate program are enclosed. A formal response is due from your program by Monday, October 27, 2014. Your response package should include appropriate program changes, statements of changed procedures, course proposals, etc., or statements of why the points in the Recommendations are not to be carried out. Acceptance of your response package by the Graduate Council will conclude the present review of the program.

Yours truly,

Ertem Tuncel, Vice Chair
Graduate Council

Cc: Geological Sciences faculty
1. Introduction

The Geological Sciences graduate program, hosted by the Department of Earth Sciences, was reviewed on May 13-14, 2014 by an extramural review team (ERT) consisting of James Farquhar (University of Maryland), Susan Kidwell (University of Chicago), and Thorne Lay (University of California Santa Cruz). The external report was sent to David Oglesby, Chair of the Department of Earth Sciences on May 21, 2014. The Graduate Council received a preliminary response from the program on June 4, 2014. The subcommittee of the Graduate Council involved in the review and in the drafting of the F&R consisted of Ertem Tuncel (Electrical Engineering), Jingsong Zhang (Chemistry), and Thomas Payne (Computer Science and Engineering).

The Geological Sciences graduate program offers M.S. and Ph.D. degrees in Geological Sciences. Per page 5 of the Program’s eBinder:

Our graduate program in Earth Sciences consists of 11 full-time ladder faculty, as well as one professor emeritus with graduate students, one adjunct professor with graduate students, and one professor in Environmental Science who uses our graduate program for his students. Including emeriti and adjuncts with students, but not including McKibben (who is now a full-time Divisional Dean) and Bekker (who started in January, 2014), we average 3 graduate students per faculty member.

The Earth Sciences Department has a total of 42 graduate students, distributed as follows:

1 in Biogeography, 4 in Climatology, 1 in Environmental Science, 11 in Geochemistry, 11 in Geophysics, 1 in Landscape Ecology, 12 in Paleontology, and 1 in Stratigraphy.

Per page 19 of the eBinder:

The Department has well-equipped labs for studies in paleontology, mineralogy and mineral physics, geomorphology and Quaternary geology, sedimentary geochemistry, and computational geophysics. In addition, we have the specialized labs described below.

- Central Facility for Advanced Microscopy and Microanalysis […]
- Digital Geologic Map Center […]
- Geochemical Kinetics Laboratory […]
- GIS and Remote Sensing […]
- Inorganic Geochemistry Labs […]
- Morphometrics Laboratory […]
- Organic Geochemistry Labs […]
- Tectonophysics […]
- Computational […]
2. Strengths, Achievements, and Challenges

Geological Sciences is a strong program in a strong department. Per the report of the External Review Team (ERT):

The Department of Earth Sciences is a small program, currently with 11 faculty FTE, but it has emerged as a golden nugget in the College of Natural and Agricultural Sciences (CNAS). The substantial research productivity, large number of high-profile research articles published in leading journals, strategic development of focused areas of research excellence, consistent placement of graduate students in high-quality junior faculty and postdoctoral positions, exemplary outreach efforts, and strong academic and collegial environment of the Department are all recognized by the campus. This has motivated the current investment in growth of the program associated with active negotiation of 4 new faculty position offers that may bring the FTE level up to 15. The program has been focused on achieving critical mass in two key areas: Organic and Paleoenvironmental Evolution (OPE) and Earthquake Processes (EP), with initial steps toward expanding foundations in Global Climate Change. The OPE effort is the most developed and has established excellence for the research and graduate program, and the EP effort is coming along well but remains fragile pending appointment of several additional faculty to solidify it. Overall, the Department of Earth Sciences is strong, functions very well, attracts excellent students, and has largely responded to recommendations of the 2006-2007 review (eliminating several problem areas). It is well poised for further CNAS investment of resources to achieve even broader program excellence.

According to information provided by the Geological Sciences Program:

[We] continue to place our graduate students in the top academic jobs (Attachment 2). Last year the two most prestigious jobs in Geobiology (Dartmouth and UC Berkeley) went to a Lyons student and a Droser student respectively.

And, per the ERT report:

The shared sense of purpose among faculty, staff, and graduate students, and the pleasure they clearly take in each others’ company and professional success, is evident immediately in the Department.

However, as noted in the self-study report on page 4 of the Program’s eBinder, UCR’s Earth Sciences Department has “about half the number of faculty of most UC Earth Sciences departments with almost as many graduate students.” That overly small size is due to attrition via retirements and has led to deficiencies in the curriculum, particularly in the area of Global Climate and Environmental Change (GCEC), which is twice mentioned in the ERT’s report as being an area of curricular deficiency.

3. Goals and Plans

As noted above, the Department is currently recruiting to fill new positions and anticipates yet further near-term growth. Per page 7 of the Program’s eBinder:
Fortunately, we have been receiving strong support for our department’s research and education goals from our administration. The College and University’s confidence in our departmental goals have led to our being allowed to search for three new faculty positions in the 2013-2014 year:

- Biogeochemical Climate Modeling
- High Resolution Records of Cenozoic Climate and Environmental Change
- Neotectonics

The first two of these positions fit within the broad OPE research area, while the third will contribute to our EP focus. We are delighted by the opportunities presented to us with these imminent hires, as well as the very recent arrival of new faculty member Bekker. Consequently, we are in a period of transition right now, and will be a 30% new department within a year. We plan to keep expanding in the future, broadening and deepening our expertise while still retaining our focus on our two main areas of strength.

4. Recommendations of the Graduate Council

Based on the external review team’s report, the Graduate Council makes the following recommendations. Please discuss each of these in turn in your response to this F&R document:

1) **Graduate Curriculum**: The extramural review team notes that the migration to a more structured curriculum, begun after the last review, is still a work in progress and that “more synoptic Earth Science lecture courses that address understanding across the spectrum of fundamental Earth Science topics are not part of the curriculum.” The Department should provide a timetable for remedying this problem; or an explanation as to why that’s impossible; or an explanation as to why the current situation is not a problem (in spite of the fact that two consecutive ERTs have said that it is).

2) **Graduate Student Support and Time to Candidacy** (the program will benefit from a thorough-going discussion with the Graduate Dean on the following issues and the outcome of that discussion should be reported back to Graduate Council as part of the response to this F&R document):
   
   - Graduate student who enter the M.S. program prior to entering the Ph.D. program are disadvantaged with respect to support. A remedy should be found for this situation.
   - TAships and summer teaching assignments facilitate the Department’s undergraduate program, support graduate students and enhance their resumes, but they also slow progress toward the degree. Policies to balance these concerns/opportunities should be established.
   - Campus funding policies have led to non-uniform candidacy deadlines that disadvantage international students. To fix this situation, the Department might consider setting the deadline for advancement to candidacy at the end of the sixth quarter. NRTs should be adjusted to make that possible for international students.
One measure that might be adopted would be to postpone one quarter of the first-year fellowship for the quarter of the qualifying exam.

3) **Graduate Student Program Administration**: The Department should establish a graduate admissions committee, arrange for simultaneous campus visits by all prospective students (in so far as practical), and arrange for more speakers from agencies and the private sector.

4) **Administrative and Technical Staff Support**: The labs and equipment mentioned on page 19 of the eBinder (cited above) are expensive to staff and maintain. The Graduate Council concurs with the extramural review team’s recommendations in terms of possible sources of funding: NSF (Earth Sciences Division Instrumentation and Facilities program) and the possibility of “taxing” grants and contracts for use of these facilities.

5) **Strategic Planning and FTE Growth Management**: Establish a tradition of annual retreats for strategic planning. Particular attention should be paid to the area of Global Climate and Environmental Change (GCEC), mentioned four times in the extramural report as an area the program is expanding as a new track for incoming students, but also as an area of curricular deficiency.

6) **Department and Program Climate**: We concur in the extramural review team’s concern that the current informal structure, which has thus far promoted an excellent climate of collegiality, might not scale up as the program expands. The Department should establish more formal mechanisms that are designed to scale up as the Department grows. Furthermore, in anticipation of future growth, the Department should establish a formal structure for mentoring junior faculty.
October 23, 2014

To: David Lo, Chair
   Graduate Council

From: Eric Chronister, Chair
       Department of Chemistry

Re: Response to the “Graduate Council Findings and Recommendations” for the Chemistry Graduate Review

As requested in your letter of September 10, 2014, the department of Chemistry is providing a formal response to the “Graduate Council Findings and Recommendations” (GCF&R) based on the May 22, 2014 External Review Team Reprt on the Chemistry Graduate Program. Itemized responses to the GCF&R are presented below.

II. Strengths, Achievements, and Challenges.
The GCF&R finds the Chemistry Graduate Program to be “a strong and valuable program with significant strength in many areas”, and that “recent hiring has resulted in an outstanding cadre of young successful faculty”. The external review team found that the Department’s goal of increasing its ranking by 20 steps “is a laudable and attainable goal” and that “the plan for doing so is strong”. It is worth noting that the UCR Chemistry Program was ranked 47th worldwide out of 1200 institutions in the most recent Academic Ranking of World Universities. This achievement is significant with respect to our ongoing efforts to increase the ranking and stature of the Chemistry graduate program. It is also instructive to note that UCR Chemistry ranks 17th among U.S. public universities. UCR Chemistry is very strong on a per capita basis and all of the public university chemistry departments ranked above us currently have much larger departments. The ongoing efforts to increase our program size will provide the breadth and depth needed to further ascend the rankings. (http://www.shanghairanking.com/SubjectChemistry2014.html)

III. Goals and Plans.
The Department is pleased that GCF&R highlighted the fact that the review team found the long-term Departmental plan to be “extensive and very thoughtfully considered, logical, and convincing.” Specifically, the plan to add faculty in specific sub-fields is well thought out and should be followed. The Department is also pleased that the GCF&R found that “plans for increasing graduate enrollment are also well designed and should lead to an improvement in national reputation.

IV. Recommendations.
The Chemistry Department is pleased that the GCF&R acknowledge, “the faculty and program in Chemistry at UCR are already doing an excellent job with what they have”. Below are itemized responses to the specific F&R recommendations.

1. Grow the faculty with an emphasis on topical hires.
The Graduate Council’s Findings and Recommendations propose that the department expand the faculty by building on core expertise that can enhance the likelihood of successful multi-PI interdisciplinary research grants. This hiring process has already begun. Chemistry currently has five faculty searches underway in three of the four areas highlighted in the most recent departmental long-range plan. The searches have been clustered to overlap with various campus initiatives and efforts to build more viable center grant efforts. These efforts include: i) two searches in Materials Chemistry aimed at building on strength and enhancing cross departmental initiative appropriate for MRSEC funding; ii) two searches in Bioanalytical Chemistry that will build on our strength in this area and which will be aimed at increasing interactions with the new medical school and overlap with NIH funding initiative; iii) a Chemical Catalysis search specifically aimed at enhancing the growth of the newly created UCR Center for Catalysis and at strengthening the ongoing effort to obtain extramural funding from the NSF Science and Technology Centers Program (proposal submission in Fall 2014, supported with seed funding by the VCREDS).

The department also agrees with the recommendation that faculty should be encouraged and rewarded for “aggressive” attempts to compete for external research funding, especially in the areas of multi-PI grants and center grants. As faculty numbers increase more instructional resources will be available to offer course relief support for the preparation of multi-investigator center grant and graduate student training grant proposals.

2. Growing the graduate program.

The Graduate Council’s Findings and Recommendations propose that the department grow the graduate program now without waiting to grow the faculty size of the Department. This enhanced recruiting effort is underway. We provided the Graduate Division with a Fall 2015 recruitment target of 30 incoming students, which represents a 15% increase over last year. We agree that the current level of grant support is adequate to support a larger graduate program. Based on the recommendations of the review team and the GC the department will work to implement “incentives and habits that lead to increased apportionment of research funds to graduate assistantships rather than postdoctoral associates”. Specifically, the department will explore rewarding increased GSR support with increased assignment of TA positions to the group. The Department has also been working with the Dean of the Graduate Division to create incentives for faculty to shift funding from postdocs to graduate students, e.g. rewarding long-term GSR with Graduate Division additional support of graduate student tuition.

3. Strengthen student recruitment and retention.

The Graduate Council’s Findings and Recommendations propose that the department strengthen student recruitment and retention in the areas listed below:

3.1 Clarification of financial support packages. The department agrees with the recommendation to simplify and clarify the formal letters of financial support offered to prospective graduate students. This effort will need to involve the Graduate Division since they currently are responsible for the official letters. It should be possible to restructure the letters to more simply outline the financial support package. Incentives to
shift grant support from post-doctorals to students will be aimed at “reducing reliance on TA support in later years of study.”

3.2 Mechanism by which students join research groups. The GCFR recommend that the department develop a “more structured and uniform mechanism by which first year graduate students join research groups.” The summer fellowship program gives new students research experience and GradEdge training aimed at accelerating progress and improving success in the program. The email invitation to prospective summer fellows highlights that there is no obligation to join the group of the summer mentor and it is not unusual for summer students do decide on a different research group for their thesis work. In response to the review recommendations the department will also re-establish a requirement for students to learn about research opportunities with at least three faculty mentors before formally selecting a research group. Our current process requires that the Graduate Advisor and the Chair sign off on the choice of mentor. This form will be amended to include three additional faculty signatures confirming that the student has an understanding of at least three different research opportunities (via attendance at faculty presentations, review of research publications, or other discussions with faculty). This process will ensure that students develop a broader knowledge of departmental research areas and will ensure a more informed choice of research group.

3.3 Recruitment of under-represented groups into the graduate program. The GCF&R recommend that the department improve existing efforts to recruit under-represented groups into the graduate program. The department is strongly committed to further increasing the diversity of our graduate program - which is already above the norm for Chemistry PhD programs. Some of our departmental efforts to increase diversity include: a) recruiting from our own very diverse UG students; b) successful federal training grant support for URM graduate students (GAANN award); c) recruiting relationships with CSU campuses with high numbers of URM graduates; and d) giving opportunities to some promising, but possibly underprepared, URM applicants. Our success at recruiting URM students is due to the efforts of the departmental recruiting committee. URM students are not recruited into particular groups (as implied by this recommendation and discouraged by the previous recommendation 3.2). URM students are welcome to join any group and the perceived clustering of URM students is largely an artifact (i.e. some large groups have more URMs). The recruiting of URM students is inherently an integrated programmatic effort that is embraced by the Department at all levels. The choice of which group a URM student chooses to join does not enter into departmental efforts to recruit URM students into the program.

3.4 Determine whether the current attrition rate is excessive. The Graduate Council’s Findings and Recommendations (GCFR) propose that the department “determine (through surveys of competing graduate programs) if the current attrition rate in Chemistry is excessive. If so, develop plans and policies to lower what seems to be a large rate of loss.” Chemistry has asked the other UC Chemistry departments for their attrition rate data. Initial feedback indicates that UCR Chemistry is within standard norms for a program of our size and ranking. Over the past 7 years the program’s PhD success rate has ranged from an abnormal low of 58% for the 2005 cohort to a high of 76% for the most recent cohort. Our most recent retention rate is in line with comparable institutions. The Department has been working to increase the PhD success
rate through: a) higher admission standards that target better qualified and motivated students; b) improved professional development of students; c) offering students early summer research fellowships prior to the start of graduate school; and d) by improving program assessment through better tracking and communication with our graduates, such as exit interviews. We are committed to improving the retention of our graduate students, but also note that efforts to improve the success rate (sec 3.4) can negatively influence diversity efforts (sec 3.3). There is a baseline attrition level related to non-academic factors (e.g. personal reasons, financial needs and opportunities, diversity efforts, etc.). Our department is committed to providing opportunities to promising, but possibly underprepared (and often more diverse) students. This group yields some excellent PhD graduates that we feel can be worth some increase in attrition.

4. Develop on-line general chemistry instruction.

The Graduate Council’s Findings and Recommendations propose that the department “begin development on-line general chemistry instruction” with the goal of releasing “faculty time for … offering more advanced instruction. In response to this recommendation the Chemistry Department has prepared a proposal entitled “Development of an online CHEM 001W Preparatory Chemistry Course” for submission to the Innovative Learning Technology Initiative (ILTI) program in November, 2014. http://www.ucop.edu/innovative-learning-technology-initiative/. Massive Open Online Courses (MOOC’s) are being used nationwide for a variety of large enrollment (non-lab based) introductory courses. Developing an online classroom approach for the CHEM 001W (Preparation for Chemistry) course will provide access to remedial chemistry instruction for a potentially large number of students. Budget cuts required suspension of CHEM 001W in 2008, but converting this course to a MOOC will allow the department to resurrect this course as an on-line option. The online Chem1W course can also be integrated into the pre-freshman summer preparation program currently in place at UCR.

5. Support mechanism for shops and instrumentation facilities.

The Department agrees with the Review Team’s assessment that the support and instrumentation infrastructure have been allowed to deteriorate, especially with respect to shop facilities and the ACIF. The Department also strongly agrees with the GCF&R that “continued maintenance of the existing facilities is critical if the program is to achieve its potential.” The Graduate Council’s Findings and Recommendations (GCFR) propose that the department “develop jointly with the CNAS Dean a better mechanism of support for the ACIF and shops” to avoid excessively burdening the research budgets of the faculty. The department agrees with this recommendation and is hopeful that the college reorganization processes will lead to more direct budgetary authority for a Divisional Dean responsible for management of the viable shops and instrumentation facilities such as ACIF.

6. Implementation timetable for the recommendations.
6.1. Grow the faculty with an emphasis on topical hires. This process is underway, with 5 faculty searches underway in 2014-15. The long-range departmental plan includes 3 additional hires per year for the next four years. The proposed faculty increases for the campus will support this departmental plan.
6.2. Growing the graduate program. This process is underway. The proposed target recruitment for the Fall 2015 cohort is 15% higher than last year. Further increases in
recruiting are planned in to keep pace with the growth of the faculty, with the goal of an average of 4-5 graduate students per research group.

6.3. **Strengthen student recruitment and retention.**

6.3.1 **Clarification of financial support packages.** The Graduate Recruiter will work with the Graduate Division to try and improve the offer letters for the Fall 2015 cohort.

6.3.2 **Mechanism by which students join research groups.** The Graduate Advisor will work with the Graduate Studies committee to develop a process by which students must explore several possible research mentors before making a final selection. This process should be complete before the arrival of the Fall 2015 cohort.

6.3.3 **Recruitment of under-represented groups into the graduate program.** Within a year the Graduate Recruiting committee will explore what additional means are available to the department for increasing URM offers/recruitments.

6.3.4 **Determine whether the current attrition rate is excessive.** Initial results indicate that current retention rates in the Chemistry graduate program are within comparable norms. Within 6 months the Chair expects to have comparable data for all UC Chemistry programs collected.

6.4. **Develop on-line general chemistry instruction.** The planning process is finished and a proposal will be submitted next month (November 2014) to the ILTI program to fund the course development process.

6.5. **Support mechanism for shops and instrumentation facilities.** A college redesign processes is currently underway and the physical science departments have asked for more direct oversight of shops and instrumentation facilities by a Divisional Dean. Chemistry is hopeful that the redesign process will provide an opportunity to reverse the recent and continuing degradation of college research support.
September 10, 2014

Eric Chronister, Chair, Chemistry  
Leonard Mueller, Vice Chair, Chemistry  
Gregory Beran, Graduate Advisor, Chemistry

RE: FINDINGS AND RECOMMENDATIONS OF THE CHEMISTRY GRADUATE PROGRAM  
REVIEW – MAY 6-7, 2014

The Findings and Recommendations of the Graduate Council resulting from the review of the Chemistry Graduate program are enclosed. A formal response is due from your program by Monday, October 27, 2014. Your response package should include appropriate program changes, statements of changed procedures, course proposals, etc., or statements of why the points in the Recommendations are not to be carried out. Acceptance of your response package by the Graduate Council will conclude the present review of the program.

Yours truly,

David Lo, Chair  
Graduate Council

Cc: Chemistry faculty
Graduate Council Findings and Recommendations
Graduate Program in Chemistry

I. Introduction
The Department of Chemistry offers the Ph.D. degree in Chemistry. At the time of the review (AY 2013-2014), there were 112 students enrolled in the program. There are currently 36 active faculty members participating in the program including 6 cooperating faculty members from the Departments of Biochemistry, Bioengineering, Electrical Engineering, Chemical/Environmental Engineering, Entomology, and Environmental Science.

The Chemistry Graduate program was reviewed May 6-7, 2014 by an external review team. Reviewers were Dr. Thomas Hoye, Professor of Chemistry, University of Minnesota, Dr. Carlito Lebrilla, Professor of Chemistry, University of California, Davis, and Dr. Stephen Leone, Professor of Chemistry and Physics, University of California, Berkeley. The external report was received May 22, 2014, and passed on to the program. Graduate Council received the program’s preliminary response to the reviewers report on June 13, 2014. The subcommittee members involved in the review and drafting of the Findings and Recommendations (F&R) were Richard Redak (Entomology), Ertem Tuncel (Electrical Engineering), and Jing Shi (Physics and Astronomy).

II. Strengths, Achievements, and Challenges.
The Chemistry Graduate Program is a strong and valuable program with significant strength in many areas. The review team indicated that the program ranks somewhere around 60-90 in the nation (below UCI, UCSD, and UCD, but above UCSC, and UCM). Limiting this ranking is the lack of NAS members and the size of the Department. Recent hiring has resulted in an outstanding cadre of young successful faculty. Nonetheless, with limited size, there is limited research and training coverage among all of the sub-fields within Chemistry. The Department has a goal of increasing its ranking by 20 steps which is a laudable and attainable goal. The plan for doing so is strong. The Department has responded very well to past reviews and has begun building strong areas of emphasis in computational chemistry, materials sciences, and biological chemistry. Teaching loads of the faculty appear to be heavy and are limiting their ability to offer advanced training. In part, this has been alleviated with the hiring of a Lecturer (SOE) to handle several of the large undergraduate courses. Consideration of future hires of this sort should be made.

Regardless, Chemistry graduate students are receiving excellent training and are well prepared for the job market (academic and private) upon graduation. Research contributions of the students are at the highest level, and their engagement with the faculty is strong. The Department is to be commended for having a very diverse graduate student population. The summer bridging programs for students effectively recruits good students from exceptionally diverse backgrounds. This program is to be encouraged with some minor modifications/clarifications (see below). Overall the graduate program is coherent with a consistent path to a Ph.D. Examination processes are clear, and the establishment of the second year SYRE exams is a positive response to previous reviews. The program does, however, appear to exhibit high attrition rate of graduate
students; although, the review team noted that this rate may not be substantially different from other Chemistry programs around the country. To address this, use of peer mentors should be continued and encouraged. Additional formal faculty mentoring should be encouraged. The review team also noted that is a substantial teaching burden on graduate student teaching assistants as well. This is contributing to the attrition rate and the time to degree. Shifting more of the senior graduate students to external funding should strongly be considered and encouraged.

The graduate program in Chemistry “attempts to span all of the important disciplines”; however the Review Team noted that with the limited faculty size it is difficult to effectively do so. Developing leadership in certain areas (sub-fields) will be required; the recommendation of using cluster hires to achieve this goal is suggested. As the Review Team indicated, “bigger is better; but faculty size is not the only factor that can and will contribute to the department’s quality and reputation...”. There is a plan in place to add faculty in key areas that optimize interdisciplinary research; this is to be encouraged.

The Review Team noted that the support and instrumentation infrastructure have been allowed to deteriorate; the electronic shop has been all but eliminated as has the glass shop. Although reductions in the ACIF have occurred, the level of support provided is not unlike other UC Chemistry departments. Continued maintenance of the existing facilities is critical if the program is to achieve its potential.

III. Goals and Plans

The Review Team found the long-term Departmental plan to be “extensive and very thoughtfully considered, logical, and convincing.” Specifically, the plan to add faculty in specific sub-fields is well thought out and should be followed. Plans for increasing graduate enrollment are also well designed and should lead to an improvement in national reputation. Recommendations for increasing national distinction (a primary goal of this graduate program) are provided below.

IV. Recommendations

Given that the faculty and program in Chemistry at UCR are already doing an excellent job with what they have, improvement to achieve future goals (increased graduate enrollment, increase in national ranking, decreased attrition, and so on) will require additional resources as well as directed efforts in specific areas. The unranked recommendations below are made to accomplish these goals.

1. Continue to grow the faculty with an emphasis on hires in topical areas that build on core expertise of current faculty while enhancing the likelihood for success in multi-PI interdisciplinary research grants. Faculty should be encouraged and rewarded for “aggressive” attempts to compete for external research funding. The overall level of current grant support is good, but can be better especially in the areas of multi-PI grants and center grants. Relatedly, the Department and CNAS development officers should aggressively increase their development efforts. There is real potential for new endowed chairs and programs in Chemistry.
2. Growing the graduate program can occur now without waiting to grow the faculty size of the Department. Funding from existing PI grants can now be directed toward student funding. The current level of grant support already is adequate to support a larger graduate program. We concur with the review team that “incentives and habits that lead to increased apportionment of research funds to graduate assistantships rather than postdoctoral associates” need to be implemented.

3. Several points related to graduate student recruitment, funding packages, and progress in the program should be addressed immediately:

- Restructure and optimize the nature of financial support offered to prospective graduate students and clarify/simplify the formal letters that deliver that information. Reduce reliance on TA support in later years of study. Restructuring financial support packages necessarily will require faculty to redirect funding from post-doctoral support to graduate student support.

- Develop a “more structured and uniform mechanism by which first year graduate students join research groups.” While the early acceptance summer program is successful in bringing students into the program, students should be given a better guidance with regard to their options for selecting a major professor.

- Improve existing efforts by the Department to recruit under-represented groups into the graduate program. Currently few faculty within the program are achieving excellent success here. The effort needs to be enhanced, integrated in the program and embraced by the Department.

- Determine (through surveys of competing graduate programs) if the current attrition rate in Chemistry is excessive. If so, develop plans and policies to lower what seems to be a large rate of loss.

4. Begin movement toward developing on-line general chemistry instruction. Success here will release faculty time for efforts directed at developing and offering more advanced instruction.

5. Develop jointly with the CNAS Dean a better mechanism of support for the ACIF and shops. The current model excessively burdens the research budgets of the faculty.

Graduate Council strongly concurs with the recommendation that the Department, the CNAS Dean, and the Graduate Dean all generate separate written responses to these finding and recommendations that explicitly define actions to be taken. In the meantime, in response to this document, the Department should provide a timetable for implementing the above recommendations so that future reviews can assess their success.