Assessment of First Examination in the Geology and Environmental Sciences Division of EES

1. Goals of the First Exam:

1. Assess the level of learning and retention of first-year students after successful completion of their required core courses in EES.
2. Assess student’s abilities to communicate, using precise scientific language, in written and oral format, answers to specific questions founded in their course work or research.
3. Assess a student’s ability to explain complex scientific issues in a simple fashion without compromising the quality of the science presented.
4. Assess if a student demonstrates significant knowledge of their proposed research areas.
5. Assess if a student shows their ability to complete Ph. D. research and dissertation writing through how they respond to both examinations.
6. Assess the preparedness of students to conduct research in the scientific discipline of their choice as well as how well students can integrate their research topic into the broad field of Earth Science. The focus here is on assessing students’ ability to formulate research questions, think and work independently and articulate a methodology appropriate to answer their question. Assess a student’s ability to communicate in public through oral presentations of research projects.

2. The steps to accomplish these goals are as follows:

1. Assessment is achieved through a written exam that is followed by an oral exam. The exam committee is composed of the professors that teach three core EES courses, EES 704, EES 716, and EES 717. The DEO is also a member of the exam committee, providing oversight in addition to participating in the oral portion of the exam. The DEO does not ask questions for the written exam unless she/he teaches one of the core courses. Dissertation advisors sit as ex officio on the committee and ask their students questions on the proposed research and related background materials.

2. The written exam is composed of up to 4 questions from each from EES 716 and 717 with 2 questions asked from EES 704. Dissertation advisors also ask 2 questions of their respected graduate student sitting for the exam. The exam is timed for a total of 6 hrs. Each question has a reference time period designed to guide the students on how long it should take to construct their answer. The exam is offered, usually, at the end of August to beginning of September at the start of year 2 of a student’s tenure in EES.

3. Approximately one-week post-written exam, an oral exam takes place. A minimum of one-hour time slot is given to each student to answer questions posed by the committee. At the start, students have the opportunity to present a well-structured
summary of their research work if already engaged in a project or on research ideas that the student is exploring. This is an important component that allows the committee to (1) assess the student’s ability to pose a research question, (2) think through an appropriate method to attempt an answer and (3) to assess how well a student understands their own research and how well they can ground their project/topic within their discipline and Earth Sciences at large. The other main motivation of the oral exam is to enable a student to elaborate on their written answers, specifically on those aspects that the committee deemed as weak answers to specific questions in the written exam. Follow-up questions are often posed to further assess how a student thinks and replies ‘on the fly’ and how well they communicate using specific language founded in science.

4. Post-examination, all students are given an exit interview with the DEO. In that interview, they are presented with a summary of their results, suggestions on means of improving wherever the committee thought they might need improvement, and an official letter documenting the outcome of the first year examination.

3. Self-review of the assessment success and implemented changes:

   Back in 2008 when the current faculty who teach the core courses began teaching, the first exam was deemed not an effective means of assessing student’s progress. The written exam was only 1 question from each of the above named faculty members and it was take-home with a one-week duration. The new faculty who taught the core EES course 716 and 717, along with the DEO, determined that the test was too simple and the students ran into significant difficulties during the oral exam. We do not have statistics on pass rates for that time period, although we keep them now. Because it was clear that the existing written exam was not assessing the performance of the students enough, it was changed.

   Over the course of the last few years, the first exam has evolved considerably with the faculty who teach EES 716 and 717 driving the changes to better assess student’s progress and help them prepare for their Ph. D. careers. The current incarnation of the written exam is the fruition of our continued efforts to better assess student’s progress.

   The implementation of an exit interview with each student, post first-exam results, is crucial in providing the venue for a dialog on a student’s progress. It also provides a means for a student to discuss their impressions of the exam process with the DEO.

   The Geology-Environmental Science faculty who teach EES 716 and 717, in consultation with the DEO, evaluate the effectiveness of the first exam on a yearly bases. At this time, these same faculty assess the as well as the courses that are taught and do make adjustments to better meet, as they see it, the goals of the program. As a general rule in EES, the program highly values productive dialog between faculty and students. We encourage feedback and we as faculty are not hindered to present our feedback to students.

   Our pass rate on the first exam over the last 4 years has been approximately 90% on the first attempt. Those students who did not pass on the first attempt were given a second chance one year later and they all passed.
This year, the core Geology and Environmental Science faculty also made changes to both EES 716 and 717, which feed directly into the success of the first exam. The changes are detailed below:

1. The first class of the academic year was attended by all four faculty members who teach EES 716 and 717. They introduced themselves to the new students, presented overviews and goals for each course, discussed general learning outcomes for the entire first year, and reviewed program logistics/scheduling. They also introduced their own research and personal philosophies of teaching and learning.
2. Faculty made changes to aspects of the subject matter that are covered in the course and to how they teach these aspects.
3. Students were still required to read refereed papers, write a one-page summary of the papers (applies to EES 716 only), and discuss the papers as a group.
4. Students were still required to complete a proposed research project/literature search for a proposed project. They were required to write a short paper on their projects and deliver an approximately 12 min talk on their findings.
5. Both courses continued (will continue) their practice of having in-class exams at the appropriate times during the semester. This style of examination, in-class exam, in the courses has been assessed by the faculty to better prepare students for the written part of their first exam.

4. The next steps that will be taken:

The current core faculty of the Geology and Environmental Sciences side of the program will, post-first exam, re-evaluate the progress of each student and the overall structure of the exam as well as the supporting courses that prepare students for the exam. These changes will be discussed with the DEO and the EO. Currently, the consensual view of the process is one of tweaking, from year to year, to ensure the learning outcomes are being met without compromising the quality of the subject matter.
Assessment of First Examination in the Geography Track of EES

1. Goals of the First Exam:

- To assess the student’s capacity for critical thinking and analysis after successful completion of his/her required core courses in EES;
- To assess the student’s mastery of three fields that might serve as areas of future teaching or research;
- To assess the student’s familiarity with and understanding of the literature of the student's proposed areas of specialization;
- To assess the student’s ability to communicate effectively, both in written and oral format, their understanding and knowledge of the subject matter in the core courses as well as in their three areas of specialization; and to be able to explain the basic concepts and tenets of his/her fields, using language appropriate to those sub-disciplines;
- To assess the preparedness of the student to conduct Ph.D. level research in his/her field using the theories, methods, and technologies appropriate to that field of inquiry.

2. The steps to accomplish these goals are as follows:

- Assessment is achieved through a two-part examination—a 30 page written exam followed by an oral. The exam committee is composed of the professors who teach the two core EES courses for students in Geography (EES 709 Geographic Thought and Theory; and EES 704 The Nature of Scientific Research), and at least one representative from each of the seven areas of specialization currently covered by the exam--Cities and Urban Processes; Physical Geography; Globalization and Uneven Development; Productions of Nature; Geographic Information Science and Spatial Methods; Health Geographies; and Geographic Knowledge in Action. (Each student selects three areas of these seven to focus on in their exam.) Reading lists for each field and the two required courses are distributed no less than one month before the exam is given. The composition of the exam committee varies depending upon what topical areas are covered by the students in any particular exam sitting. Either the EO or DEO sits on the committee as well.

- The written exam has usually been offered in late August, with the oral scheduled during early September, and again during late January, with the oral scheduled during early February. Students may sit for the exam any time after completion of the requisite coursework following their first year of doctoral study, and before they embark on writing their dissertation proposal.

- The written portion of the exam is a take-home exam, and the student has ten days to complete it. The written exam consists of a choice of two questions from each of the five areas (the two core courses and the three areas of specialization selected by the student) for a total of ten questions requiring responses of approximately three pages each plus references.

- The oral portion of the examination is scheduled about ten days following the written exam to give the faculty on the examination committee time to review the exams. A minimum of 30 minutes is given to each student to answer questions posed by the committee. These questions may be any or all of the following: follow-up questions prompted by the student’s written responses on the exam; questions of a more general
nature concerning the discipline of Geography or their areas of specialization; questions specific to the student’s research topic, if it has been determined by the time of the exam. A main purpose of the oral portion of the exam is to enable students to elaborate on their written answers, specifically on those aspects that the committee might deem as weak responses to specific questions in the written exam. Follow-up questions are often posed to further assess how a student thinks and replies ‘on the fly,’ and how well they communicate using the terminology associated with their fields of study and the discipline of Geography.

- Immediately post-examination, students are given an evaluation of their exam results by the First Exam Committee. In that evaluation discussion, they are presented with a summary of their results, with suggestions for improvement or directions in which they may take their scholarship. All students receive an official letter from the program’s Executive Officer documenting the outcome of the First Examination. Upon successfully completing the exam students have the opportunity to transfer credits from another graduate degree or program.

3. Self-review of the assessment success and implemented changes:

Before 2008 the First Exam was an oral exam only, but due to the inconsistency of the type of questions asked, the seeming arbitrariness of the committee’s make-up, and the uncertainty of the test’s rigor, students found it a disconcerting and unhelpful experience, and difficult to prepare for properly. It was also difficult for faculty on the First Exam Committee to truly assess the student’s knowledge of his/her areas of specialization or be able to judge his/her likelihood for success in doctoral level research. Most of the Exam Committee, as well as many students, were dissatisfied with the nebulousness of the exam in this format. Faculty felt that the exam as then structured did not do a thorough and definitive job of assessing whether students had mastered the subject matter in their discipline, and were ready to move on to rigorous research-oriented work, and students felt the exam was somewhat arbitrary, unfair, and enormously dependent upon the whims of the committee members present, which itself was not consistent year to year.

The First Exam was revised in 2008, and considerably revamped in format and length. The areas of specialization were altered to better reflect the sub-fields thought to encompass our students’ and faculty’s main interests and the current curriculum. The six new topical areas were Cities and Urban Processes, Geographic Information Science and Spatial Methods, Globalization and Uneven Development, Health Geographies, Physical Geography, and Productions of Nature. There was much debate in our Curriculum Committee over the delineation of these areas, which were thought by some to be too specific, redundant and/or overlapping, and not necessarily reflective of recognized broadly defined sub-disciplines of Geography, which could encompass shifts in faculty specializations as the doctoral program evolved.

Also in 2008 a written component was added as a take-home exam in order to give students sufficient time to develop meaningful responses to the questions. Students were given the option of choosing to be examined in two of the above topics in addition to readings from three core courses (Geographic Thought and Theory, The Nature of Scientific Research, and Geographic
In December 2011, the First Exam underwent another slight adjustment in that Geographic Knowledge in Action was dropped as a required course, but added to the six areas of specialization from which students could choose to be examined. For the August 2012 examination only, students were also given the option of creating their own “custom” reading lists for their area of specialization if they felt that none of the existing areas matched well enough with their actual area of specialization. Beginning with the August 2012 exam the number of questions per area was standardized to 2 (from a choice of 3 or more in each topical area), and the response length was restricted to 3 pages per question, plus references.

In 2014, as part of the current assessment exercise, students on the EES Curriculum Committee developed a survey for their colleagues who had taken the exam in prior terms to gather opinions and feedback about the exam. Only 6 students responded, so basing any recommendations on such an unreliable and almost anecdotal sample is of somewhat tenuous validity, especially since most of the respondents completed the exam prior to its assuming its current form. Nevertheless, there seemed to be a few key points that can be gleaned from the survey responses:

- There is incomplete coordination/correspondence between the core courses, the topical courses as offered, and the areas of specialization in the examination. The exam and the courses have not been adequately connected.
- The current set of specialization areas does not necessarily encompass students’ interests or faculty expertise, requiring students to study up on things in which no courses have been offered during their first two years of study just to pass the exam. Moreover, the courses associated with each of the specialization areas may not necessarily have been the ones students have taken, nor are they available consistently.
- Better consensus is needed amongst faculty on what the exam should cover and how to create reading lists to better prepare students. The reading lists are of uneven quality, comprehensiveness, and timeliness amongst the specialization areas and core courses.
- It’s good to have flexibility and options for students in the timing of the exam (e.g., after their first year, or even later);
- The time frame of the exam was judged to be fair as is (10 days for written exam, with oral exam following 7-10 days later).
- The oral exam was deemed to be of questionable value by some of the survey respondents, who did not feel it was worthwhile or contributed in any meaningful way to the overall evaluation of their abilities. Others thought it was OK. Some students in informal discussions mentioned they were grateful for the oral exam because it gave them the opportunity to expand upon their written responses, and defend their positions that the examiners had questioned. Some students recognize that they are better at oral presentations and others at written work, so the combined written/oral exam structure gives students the opportunity to put their best foot forward.
Judging by the survey, it seems that students expect the First Exam to closely mirror their coursework. Not only are the requisite courses not always taught regularly, but it is unclear whether that concept really serves the purpose of the First Exam, which perhaps should be built on examining broader principles. This concern goes back to the somewhat contingent nature of the original six topical areas and their apparent unevenness—some reflect comprehensive broadly defined sub-disciplines of Geography, while others seem more topical, course driven, and faculty-specific. These issues raise the question of whether students declaring a specialization area such as ‘Productions of Nature,’ for example, should expect that the First Exam cover the content of a course called Productions of Nature. This concern, among others, points to some limitations of the First Exam as currently structured. First, it is a bit redundant and problematic to base an examination area on a course, because after all, the students should have been evaluated on their knowledge of that material in the course itself. Second, some of the specialization areas are too tightly delineated, which a couple of the survey respondents also mentioned. It seems to the Assessment Committee that at the very least, broader examination categories are called for, which would cover more than the material of a single course. This concern might also point to the need for students to take more than one year of coursework before taking the First Exam.

Since the Geography First Exam was revamped to encompass an oral and written portion in 2008, 37 students have taken the exam. The pass rate has been approximately 78% on the first attempt, with an additional 8% passing conditionally (after retaking one or two topics or writing a paper to clarify their understanding of a given field). Five students (14%) did not pass on the first attempt, and were given a second chance later, generally a term or two after the first attempt, and all but one of them passed on the second attempt. In some instances, students who did not perform in a stellar fashion on the first attempt at the exam were given an opportunity to work closely with a faculty member to improve the problem areas, and then the faculty person supervising this “remedial” work would recommend whether or not in their estimation, the student should re-take the test or any part of it. This has been a useful and productive means of addressing weaknesses identified through the diagnostic aspect of the examination.

4. Proposed Changes:

We will no longer offer a January sitting for the exam, as mobilizing the exam committee twice a year requires a lot of effort for little apparent gain.

We recognize that the examination as it stands is not as effective an instrument as it could be for the goals set forth in Section 1 above. In particular we would like it to be more of a diagnostic exam that assesses students’ capacity to analyze a problem, develop a research strategy, read critically, and write cogently. In its current form, the exam is more of a field exam, but even at that it seems a bit random, as was discussed above. Thus a subgroup of the geography faculty met and came up with some ideas for a new format that we will propose to the curriculum and executive committees this fall. These ideas are still in a preliminary phase, but their broad contours are as follows:

The exam will consist of four parts: two parts will be field or topic oriented, keyed to courses in our curriculum but not reliant on any particular course (and thus may shift over time as the
curriculum shifts); one part will focus on methodology and the formation of a research question; and one part will focus on the student’s proposed area of specialization. Students will work out the topics and reading lists in consultation with their advisor. In preparing for the exam, students will be asked to develop their reading lists as annotated bibliographies. While these bibliographies would differ from what they would need to do for their dissertation proposal, the exercise will be excellent preparation for writing a literature review for their own research and would be a valuable exercise.

The exam would remain a take home examination followed by an oral. Each of the four parts would be 1250-1300 words plus references, and students would be given a week to complete the written exam, followed by an oral examination of about half an hour a week or so later.

Students entering with a Bachelor’s degree would be expected to take the First Exam no later than the start of their third year, and students entering with a Master’s degree would be expected to take the exam no later than the start of their second year. Prior to sitting the exam the student would be required to pass The Nature of Scientific Research, Geographic Thought and Theory, and a research methods class. The first two are required classes given each year in EES, and the third would be an elective chosen with the approval of the advisor. We plan to work toward developing a research methods course that we would offer each year as well. The proposed sequence of courses for all entering Geography students would thus be:

Semester 1  Geographic Thought and Theory
Semester 2  The Nature of Scientific Research
Semester 3  Research Methods (to be developed)

5. The next steps that will be taken:

The above ideas will be developed into a proposal and presented for discussion and revision to the Curriculum Committee in early Fall 2014. The revised proposal will be presented to the Executive Committee during the Fall 2014 semester, and then to the Graduate Council so that the new First Exam format can be put in place by August 2015. After 2 years of the new format, we will conduct a follow-up assessment. In addition we will be revamping our curriculum to better and more consistently cover the fields associated with our faculty’s strengths and the contemporary discipline of Geography.