

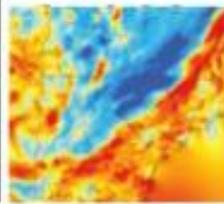
Center for Earthquake Research and Information



# GRADUATE STUDENT HANDBOOK



University of Memphis



FALL 2015

## **INTRODUCTION**

This booklet has been prepared to provide graduate students at the Center for Earthquake Research and Information (CERI) with summary statements on policies and procedures that relate to the academic program and facilities. These policies and procedures supplement those of the Graduate School as published in the Graduate Bulletin and in the University of Memphis Student Handbook. The student is responsible for knowing and complying with the published regulations of the Graduate School.

## **GENERAL PROCEDURES**

### **Administration and Organization**

The Graduate Program Coordinator is responsible for administering the graduate program. Specific duties include certifying completion of degree requirements and approving final theses/dissertations, appointing Research Assistants (in consultation with project directors), assigning student offices, scheduling and developing graduate courses, appointing preliminary M.S. and Ph.D. advisory committees, administering admissions, recommending fellowships, monitoring the annual review of student progress, and maintaining official student files. A staff member, the Academic Services Coordinator, assists the Graduate Program Coordinator.

### **Background Requirements for Admission**

Applicants are expected to have a bachelor's degree in some branch of the natural or physical sciences, computer science, engineering, or mathematics. An applicant also is expected to have completed standard introductory courses in geoscience, chemistry, calculus-based physics, and mathematics through differential equations. Applicants with a bachelor's degree and an academic record of quality in a relevant field may proceed with a graduate program. Applicants are expected to have a minimum score of 151 on the quantitative section of the GRE. For international students, a minimum of 550 on the paper-based, 210 on the computer-based or 79 on the internet-based Test of English as a Foreign Language (TOEFL) is required.

### **Transfer Credit**

In order for courses to transfer from another institution they must 1) not have been used to earn a previously awarded degree, 2) relate to the content of the graduate program, and 3) not exceed time limits set for the masters and doctoral programs. A course will not transfer if the associated grade is below a "B" (3.0). Credits earned at another institution must be presented for evaluation not later than the end of the student's second semester of enrollment. Approved transfer credit may be accepted for no more than 10 semester hours of course credit toward a Master's degree. The student's advisory committee will determine the number of credit hours that should transfer, based upon the content of the courses taken previously. Credit can be transferred toward a doctoral program upon approval of the advisory committee but the last 30 semester hours of credit for the doctoral degree must be earned at the University of Memphis. For Masters and Doctoral

students, the maximum amount of combined hours of transfer credit, credit by examination, course validation and experiential learning that can be used to fulfill degree requirements is less than one-third the number of hours required for the degree.

### **International Students**

International students must attend a mandatory set of meetings at the start of their first semester. These meetings are run by the International Student Office and include topics such as INS laws, health insurance, social security, tutoring, TB test scheduling, and the SPEAK test. International students are NOT required by CERI to take the SPEAK test.

### **Faculty Advisors and Advisory Committees**

Upon arrival at CERI, a student will be assigned a preliminary advisory committee consisting of five faculty members for the Ph.D. student and three faculty members for the M.S. student. The committee will contain a preliminary advisor. The purpose of the committee is to assist the student in selecting appropriate courses for the first semester. The committee will review the student's academic background, prior course work, research experience, and intended area of study (if known). The committee will be available to answer any questions posed by the student. The committee, rather than the preliminary advisor alone, has the authority to make decisions regarding the student's selection of courses. The preliminary committee will fill out a Program Planning form indicating the student's selected courses. This form will be entered in the official student file. The committee must approve any modifications to the academic program and an updated Program Planning form, signed by the committee and dated, must be submitted to the Graduate Student Coordinator for the file.

The student is urged to select a permanent advisor and permanent committee as soon as possible. The preliminary committee will be dissolved at the start of the first Spring Break for students entering in the fall semester and the start of the first fall semester for students entering in the spring semester. The student must select a permanent advisor and committee by these dates. Failure to do so will result in a permanent advisor and committee being selected by the Graduate Program Coordinator.

One member of a Ph.D. advisory committee must be external to CERI. External members from other universities/institutions/agencies may serve on the Ph.D. committee but must obtain adjunct faculty status through the University of Memphis and must agree to be present for the dissertation defense. Please note that the ability of a faculty member to serve as an advisor depends upon their graduate faculty status. Full and associate graduate faculty members may chair master's committees. Only full graduate faculty members can chair doctoral committees. Affiliate or adjunct faculty members can serve on masters and doctoral committees but may not chair them. Only one adjunct or affiliate graduate faculty member may serve on a student's committee.

### **Changing the Permanent Advisor or Permanent Committee Member**

A change in advisor may become necessary for many reasons. Sometimes a student develops a strong interest in a project that is being overseen by a different faculty

member or changes research interests upon exposure to different aspects of geophysics. In cases such as these, the student is encouraged to change advisors but must first establish that the new faculty member is willing to become the permanent advisor. In other cases that involve a less than desirable working relationship with the permanent advisor, the student should discuss the problem with the Graduate Program Coordinator. The Coordinator will serve as the student's advocate and discuss the problem with the advisor. Often these problems can be resolved to the benefit of all but sometimes a change in advisor may be recommended. A change in the advisor or a member of the permanent advisory committee will require approval by the Coordinator and submission of appropriate forms to the Graduate School.

### **Course Schedule Planning**

Each student will meet with his or her M.S. or Ph.D. advisory committee to determine a course schedule for the following semester. Committee members and the student will indicate the course schedule on the Program Planning form and present a copy of the form to the Academic Services Coordinator for the file. The committee must approve any modifications to the academic program and an updated Program Planning form, signed by the committee and dated, must be submitted to the Academic Services Coordinator.

### **Credit Loads**

Graduate assistants supported by CERI (COE) or external funds at the normal half-time level (20 hours/week) are required by the University to register for 9 credits per semester. Graduate students registered for 9 hours of credit are considered to be full-time students. Students taking thesis or dissertation credit only are considered full-time if they are registered for 6 credit hours.

### **English Competency**

Graduate students will be expected to demonstrate proficiency in communicating scientific information and ideas in formal and informal professional meetings. The important settings in which skills will be needed are oral exams, oral presentations at CERI and scientific meetings, and teaching assignments. We expect spoken English to be of sufficient quality that listeners can concentrate on data and ideas rather than on the form of delivery, and that questions addressed to the student are readily comprehended. We expect oral presentations to be organized in a logical sequence.

We expect students to perform with a uniform standard of quality in writing. Documents should demonstrate correct grammar, spelling, and punctuation. Organization, sentence length, logical sequences of thought, clarity, and avoidance of jargon and colloquialisms are expected components in all formal written documents. Students needing assistance with writing skills are urged to contact the University Writing Center (<http://blogs.memphis.edu/provost/2014/03/06/u-of-m-to-develop-center-for-writers/>).

### **Annual Review of Progress**

Each student will complete a Progress Report form with his or her M.S. or Ph.D. advisory committee when the committee meets to determine a course schedule for the spring semester (usually in November). The report is an evaluation of the student's progress and serves as the student's request for assistantship appointment or reappointment. In order to be making satisfactory progress, a student must maintain a 3.0 GPA. The advisor will also complete a section of the report, commenting on the student's progress and worthiness of support. The Graduate Program Coordinator will review the reports and make a determination of acceptable or unacceptable progress. If a report is deemed unacceptable, the Graduate Program Coordinator will meet with the student's advisor and advisory committee to recommend whether the student's financial support or academic program, or both, will be terminated. The student will be informed of the results of the evaluation, and a copy will be placed in the official file.

### **The Official Student File**

The Graduate Student Coordinator maintains an official file on each student that contains application materials, assistantship appointment papers, transcripts and grade sheets, progress reports, thesis/dissertation proposals, results of candidacy examinations, all official communications to the student, copies of fellowship applications, and communications with the Graduate School. Faculty comments written on examination papers and on fellowship applications will be preserved in this file. A student has the right to review material in his/her file.

### **Length of Time and Support for a Degree**

Graduate programs should be planned to require no more than 2 years for the M.S. degree and 3 additional years, or a total of 5 years, for the Ph.D. degree if the student remains at CERI. The 5-year period also applies to those who bypass the M.S. degree. For students entering CERI with the M.S., acquiring the Ph.D. degree should take 4 years. Students will not, except in very unusual cases, be awarded financial support beyond these limits. Requests for support beyond the above limits from any source must be approved by the Director of CERI. Decisions on CERI Center of Excellence (COE) support beyond the normal limits will be based on criteria to include: availability of funds, numbers of semesters over the limit, student expertise, CERI needs, scholarship, and financial need.

### **Financial Support for Graduate Students: Basis of Support**

CERI is committed to provide financial support for graduate students who have been admitted with support and are making satisfactory progress toward the completion of their degree. That commitment is contingent upon the availability of CERI COE funds or funds from external research grants. It is the expectation of CERI that Ph.D. students will spend no more than 4 semesters on COE support with the rest of their support coming from external research assistantships or fellowships. Fellowships are sponsored by external benefactors and through the Graduate School. Nominations for fellowships and fellowship awards are made by CERI on a competitive basis within the guidelines of eligibility.

Students admitted without CERI support may petition the Director of CERI for support. Such decisions are normally made in conjunction with decisions to award support to new applicants to the graduate program. Occasionally, support may be given on a temporary (semester) basis as particular needs in a research project arise. P.I.s of projects may also pay hourly wages to students without support as needs arise.

In order to receive COE funding, a student must be admitted to the graduate program at CERI. Students requesting COE funding but presently enrolled in other graduate programs at the University of Memphis, will have to apply and be admitted to the graduate program at CERI. Admission to the graduate program at CERI will not guarantee financial support; support will be rewarded on a competitive basis. Faculty members may support students in other graduate programs using funds derived from external sources.

### **Duties of Graduate Assistants**

Research assistantship duties require 20 hours per week at the half-time support level. Assistantships are made for the periods September 1 – December 31, January 1 – May 31, June 1 – August 31. Students who are supported on assistantships are expected to be available for assignments during the entire employment period; permission must be obtained from the thesis/dissertation advisor or the person providing support to be unavailable on days other than official University of Memphis holidays. Note that the entire break between fall and spring semesters is not designated as an official holiday.

### **Interaction with the Media**

The University is located next to an active, intraplate seismic zone – the New Madrid seismic zone. Public awareness (although not necessarily understanding) of earthquake hazard is somewhat higher here than in other places. Felt earthquakes, identification of paleoseismic features, and damaging earthquakes that occur in other portions of the world often bring reporters to CERI seeking information. Graduate students should not interact with the media unless accompanied by a faculty member or a staff member trained in public relations. There have been instances where unsuspecting students have been misquoted and it is inappropriate to subject students to the pressure of dealing with reporter's questions. If you are the only person at CERI when reporters arrive, ask them to wait for comments until the Information Services Director or a faculty member arrives.

### **Travel Funds**

Pending availability of funds, CERI will cover all or part of the cost for a student to attend a meeting if the student is presenting a paper or a poster. Repeated funding of the same student will be at the discretion of the Director.

### **The Palisades Geophysical Institute Fellowship**

CERI offers the Palisades Geophysical Institute (PGI) Fellowship to outstanding first year Ph.D. students but can be awarded to M.S. students and to students beyond their first year of graduate study at CERI. The fellowship can be awarded to the same person more

than once. The PGI was established in 1970 for the purpose of continuing government sponsored research formally conducted by Columbia University. The PGI Fellowship was made available to CERI in 1998, largely through the efforts of Dr. James Dorman. Nominations of fellowship recipients are made by the Director of the Graduate Program Coordinator in consultation with the CERI faculty. The Dean of the College of Arts and Sciences has responsibility for establishing selection criteria and awarding the geophysics fellowship.

### **Health Insurance**

International students and their dependents are required to have health insurance coverage. You are responsible for purchasing your own health insurance as soon as you arrive at the University. The University has a preferred insurance policy for graduate students that will provide adequate coverage at a low rate. International students who do not purchase the preferred policy must demonstrate that the policy they have chosen is comparable in coverage to the University preferred policy.

### **Student Research Forum**

This is a university sponsored annual event that provides a multidisciplinary showcase for graduate student research. Awards are presented for the best posters. CERI Masters and Ph.D. students are encouraged to participate.

### **Plagiarism**

Often, a student will use material from a source and not realize that the source must be cited. To not cite properly is plagiarism and can result in serious consequences. Plagiarism is particularly problematic with all of the information available on the internet. It is very important to understand what plagiarism is and how to avoid it. The following is taken from

[http://www.memphis.edu/gradschool/tdinfo\\_electronic.php#plagiarism](http://www.memphis.edu/gradschool/tdinfo_electronic.php#plagiarism)

“The term plagiarism includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full or clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials. Published or unpublished work might include art, graphics, computer programs, raw data, web sites, music and any other type of creative expression. The most obvious form of plagiarism is copying word-for-word without enclosing the copied work in quotation marks and without citing the original source in the text.

### **GUIDELINES FOR AVOIDING PLAGIARISM:**

- Use Your Own Words and Ideas. Practice is essential to learning. Each time you choose your words, order your thoughts, and convey your ideas, you can improve your writing.
- Give Credit for Copied, Adapted, or Paraphrased Material. If you repeat another's exact words, you MUST use quotation marks AND cite the source. If you adapt a

- chart or paraphrase a sentence, you must still cite the source. Paraphrase means that you restate the author's ideas, meaning, and information in your own words.
- Avoid Using Others' Work with Minor Cosmetic Changes. Examples: using "less" for "fewer", reversing the order of a sentence, changing terms in a computer code, or altering a spreadsheet layout. If the work is essentially the same, you must give credit.
  - There Are No Freebies. ALWAYS cite words, information, and ideas you use if they are new to you (learned in your research). No matter where you find it--even in an encyclopedia or on the Internet -- you must cite it.
  - Beware of Common Knowledge. You don't have to cite "common knowledge," BUT the fact must be commonly known."

An excellent guide to avoiding plagiarism can be found at [http://www.memphis.edu/history/misconduct\\_plagiarism.htm](http://www.memphis.edu/history/misconduct_plagiarism.htm)

### **Writing the Thesis or Dissertation**

Writing a thesis or dissertation usually takes much more time than a student anticipates. Some of the additional time is imposed by corrections to drafts suggested by the advisor and committee members. However, most of the additional time is taken up by unexpected problems that arise as the writing progresses. For example, students often see a hole in their analysis and begin a new round of computations. This is normal and happens to most scientists when they think a project is complete. The correct approach to writing the thesis or dissertation by the expected defense date is to start writing as early as possible. For a Masters student completing a thesis by the end of the spring semester, writing should begin no later than the start of the spring semester. For a Ph.D. student completing a dissertation by the end of the spring semester, writing should begin well before the start of the spring semester.

### **Theses or Dissertations with Separate Research Chapters**

Theses or dissertations consisting of chapters representing separate research papers that are or will be published in journals are preferred. The main criterion for deciding whether a published (or about-to-be-published) manuscript may appear in the thesis or dissertation, in part or in its entirety, depends upon whether the thesis or dissertation is considered the primary source for the journal articles. This insures that all work is a product of the M.S. or Ph.D. study.

If pre-published work is included in the thesis or dissertation, it must be consistent with the rest of the document, so that the result is a cohesive document with an introduction that provides a framework for linking the chapters and a conclusion. Thus, the thesis or dissertation provides a source for those who want to study the research in greater detail than can be found in a journal article.

### **Multi-Authored Papers**

The student must be first author on all published or about-to-be-published manuscripts that form a portion or portions of the thesis or dissertation. CERI will accept multi-

authored material if the candidate is first author of the material and if the candidate's contributions are clearly and fully indicated in the conclusion section. In particular, the contributions of each author in each chapter to data acquisition and data analysis should be properly attributed. Advisory committees should specifically address such contributions and reach a consensus that the candidate's contributions represent independent work in data acquisition, data analysis, and writing (subject to normal review by the advisor, committee, and colleagues).

### **The State of the Thesis or Dissertation at the Time of Defense**

The expectation by CERI is that the thesis or dissertation draft presented to the committee will be a final draft version. To ensure this goal, the advisor may have to read several drafts of the work prior to submission to the committee. The advisor must determine that the thesis or dissertation is grammatically correct as well as scientifically correct before it is presented to the committee. Scientific ideas in a thesis or dissertation must be clearly stated in correct grammar. The defense copy should contain appropriate notes, bibliography, tables, figures, etc. Both the advisor and the student are responsible for assuring that there are a sufficient number of drafts for all committee members, and that there has been adequate consultation with committee members well in advance of the thesis or dissertation defense. If a copy of the thesis or dissertation submitted to a committee member is not in suitable form, the member should return it to the student and, if necessary, the defense should be rescheduled. If a previous draft was read and comments were submitted to the student, then the student should have either incorporated the comments into the thesis or dissertation or should have supplied justification as to why the comments were not incorporated.

Committees have considerable latitude on the issue of scientific content of a thesis or dissertation (as opposed to the clear statement of scientific ideas). Some committees will want to settle questions or disagreements about scientific approaches and conclusions before the defense. Others may prefer to defer some or all such questions to the defense. The advisor, committee and student should agree on the proper venue for discussion of such questions but should adhere to the standard that the defense copy and the final submitted copy should be essentially the same. Clearly, if there is a major disagreement among committee members regarding scientific content, then the material in question should be resolved prior to the thesis or dissertation defense.

### **Submission of the Thesis or Dissertation to the Advisory Committee**

The student must provide a final draft copy (the draft read and approved by the advisor) of the thesis or dissertation to each member of the advisory committee at least 2 weeks prior to the date of the examination. The copy of the thesis or dissertation presented must be complete in every detail and in suitable form for presentation to the Graduate School. In most cases, very few changes should have to be made in style or content of the thesis or dissertation after the defense. The advisor will be asked to sign a Defense Authorization form 3 days prior to the defense, signifying that he/she has polled the committee members and that a majority of the committee agrees that the thesis or dissertation is in defensible form. Faculty should read the thesis or dissertation draft quickly to ensure that the poll can be completed 3 days before the exam.

## Submission to the Graduate School

A "paper" copy printed on standard computer paper must be submitted to the graduate school **AFTER** you have defended and made all corrections given to you at the time of your final defense. After the graduate school corrections have been made, the thesis or dissertation is submitted to the Electronic Thesis and Dissertation archival system. Required forms for graduation can be found at [www.memphis.edu/gradschool/tdinfo.php](http://www.memphis.edu/gradschool/tdinfo.php) and complete instructions for final thesis/dissertation preparation can be found at [www.memphis.edu/gradschool/tdinfo\\_electronic.php](http://www.memphis.edu/gradschool/tdinfo_electronic.php). Please note that the university deadlines and requirements change periodically. Thus it is important to check the appropriate websites rather than rely upon information from other people. Please provide a PDF of the final version of the thesis or dissertation to your advisor and committee members.

## Student Progress through the Graduate Program

The following charts are provided to assist students in meeting important deadlines. The M.S. and Ph.D. Checklists contain more specific information and additional requirements (see Appendix A). The charts are presented in calendar format in Appendix B.

### **For Students Entering the Program in the Fall Semester:**

#### Masters Degree:

August -meet with the preliminary committee

international students: please see section International Students for further requirements

Spring Break 1<sup>st</sup> spring semester – select major advisor and advisory committee

June 1 - write thesis proposal; get proposal approved by your advisory committee  
submit approved copy (PDF) of the thesis proposal to the Graduate Student Coordinator

remove all undergraduate deficiencies

End of summer - take the Comprehensive Exam during the week before the start of fall classes

During 2nd fall semester – give a brown bag talk at CERI discussing your thesis project

Start of the 2<sup>nd</sup> spring semester – fill out Intent to Graduate and Candidacy forms

End of the 2nd spring semester –

complete all graduate course work (32 hours)

defend thesis

*Note: a student must be registered during the semester containing the thesis defense as well as the semester in which they intend to graduate.*

#### Ph.D. Degree

August - meet with the preliminary committee

international students: please see section International Students for further requirements

Spring Break 1<sup>st</sup> spring semester – select major advisor and advisory committee

End of the 1st spring semester

remove all undergraduate deficiencies

End of the first summer – take the Qualifying Examination  
End of the second spring semester (June 1) –  
    write dissertation proposal; get proposal approved by the advisory committee  
    submit a copy of the approved dissertation proposal to the Graduate Student  
    Coordinator  
    Complete all required graduate course work other than dissertation hours

End of the 2<sup>nd</sup> summer – take the Comprehensive Examination  
During the 3<sup>rd</sup> fall semester –  
    give a brown bag talk at CERI discussing your research  
Start of the 4<sup>th</sup> spring semester – fill out Intent to Graduate and Candidacy forms  
End of 4<sup>th</sup> spring semester –  
    Submit two manuscripts for publication in refereed journals  
    Complete all graduate course work (72 hours)  
    Defend dissertation  
*Note: Doctoral candidates must register for dissertation credit each academic semester (fall and spring) until the dissertation is completed. Students must enroll in the summer semester if they plan to complete and defend their dissertation then.*

### **For Students Entering the Program in the Spring Semester**

#### Masters Degree:

January –  
    meet with the preliminary committee  
    international students: please see section International Students for further requirements  
Start of the 1<sup>st</sup> fall semester – select major advisor and advisory committee  
Fall Break 1st fall semester –  
    write thesis proposal; get proposal approved by the advisory committee  
    submit approved copy of the thesis proposal to the Graduate Student Coordinator  
End of the 1<sup>st</sup> fall semester - remove all undergraduate deficiencies  
Start of the 2nd spring semester - take the Comprehensive Exam before classes start  
During 2nd spring semester – give a brown bag talk at CERI discussing your thesis project  
Start of the 2<sup>nd</sup> fall semester – fill out Intent to Graduate and Candidacy forms  
End of the 2nd fall semester –  
    complete all graduate course work (32 hours)  
    defend thesis  
*Note: a student must be registered during the semester containing the thesis defense as well as the semester in which they intend to graduate.*

#### Ph.D. Degree

January – meet with the preliminary committee  
    international students: please see section International Students for further requirements  
Start of 1st fall semester – select major advisor and advisory committee  
End of the 1st fall semester

remove all undergraduate deficiencies  
Beginning of the 2<sup>nd</sup> spring semester – take the Qualifying Examination before classes start  
Start of the 2<sup>nd</sup> fall semester –  
    write dissertation proposal; get proposal approved by the advisory committee  
    submit a copy of the approved dissertation proposal and an abstract of the proposal to the Graduate Student Coordinator  
End of the 2<sup>nd</sup> fall semester - Complete all required graduate course work other than dissertation hours  
Beginning of the 3<sup>rd</sup> spring semester – take the Comprehensive Examination before classes start  
During the 3<sup>rd</sup> spring semester –  
    give a brown bag talk at CERI discussing your research  
Start of the 4<sup>th</sup> fall semester – fill out Intent to Graduate and Candidacy forms  
End of 4<sup>th</sup> fall semester –  
    Submit two manuscripts to refereed journals  
    Complete all graduate course work (72 hours)  
    Defend dissertation  
*Note: Doctoral candidates must register for dissertation credit each academic semester (fall and spring) until the dissertation is completed. Students must enroll in the summer semester if they plan to complete and defend their dissertation then.*

**THE MASTER OF SCIENCE DEGREE**  
Masters in Earth Science with a Geophysics Concentration

**Program Requirements**

Thesis Option

1. A minimum of 32 credit hours
2. A student may be asked to make up deficiencies as determined by the advisory committee
3. No more than 9 credit hours of credit at the 6000 level may be counted toward the Masters of Science degree.
4. A minimum of 12 credit hours must be in courses numbered GEOP 7020-7405
5. A minimum of one seminar selected from GEOP 7701 or GEOP 7702 is required
6. Successful completion of the Comprehensive Examination
7. Preparation of an acceptable thesis proposal and oral presentation of the thesis proposal (“brown bag” presentation)
8. Completion and successful defense of a thesis (a minimum of 6 credit hours of GEOP 7996 (Thesis))
9. No more than 6 credit hours of GEOP 7996 (Thesis) can be applied to the 32 hour total)
10. Electives selected in consultation with the advisory committee to complete 32 credit hours
11. No more than 6 credit hours of Independent Study (GEOP 7621) can be counted toward the Masters of Science degree

Non-Thesis Option

If a non-thesis program is selected, the requirements are the same as the thesis option except that 1) thesis credit hours are replaced with two additional CERI 7000 level courses and 2) the thesis is replaced by a paper submitted for publication in a refereed journal, earning 3 credit hours in Independent Study (GEOP 7621). Thesis credits (GEOP 7996) do not count toward the non-thesis degree. When appropriate, the written portion of the Doctoral comprehensive exam may substitute for the Masters comprehensive exam.

**Time Limitation**

All requirements for the degree must be completed in six years. No course credit earned more than six years prior to the student’s expected date of completion of the master’s degree will be applied toward satisfying course requirements for the degree. There are no exceptions to this policy. However, students may request the option of validating old courses as described in the *Academic Regulations* portion of the Graduate Catalog.

**Comprehensive Examination**

The student’s advisory committee will administer a written examination one week prior to the start of the second fall semester (for students entering in the fall) or one week prior to the start of the second spring semester (for students entering in the spring). The examination will not exceed three hours in length and will cover basic material presented in courses taken while the student was enrolled in the graduate program at CERI. The

thesis advisor will be responsible for compiling the examination using a selection of questions provided by faculty members who taught the courses taken by the student. Students are encouraged to discuss the nature and content of the questions to be asked with the faculty members supplying the questions. The committee members will grade the exam using answers provided by the faculty members supplying the questions and discuss the overall performance of the student. A majority of the committee members must certify that the student has passed. If the student fails the examination, it may be taken again after one additional semester of residence.

### **Admission to Candidacy**

This usually occurs at the start of the last semester of residence. The following requirements apply:

1. The student must file a “Master’s Degree Candidacy Form” and a graduation application by the deadline indicated on the Graduate School web site.
2. An approved Thesis Proposal form must be filed with the Graduate School.
3. The student must have a cumulative GPA of 3.0 or higher in all graduate courses taken at the University of Memphis. No more than 7 hours of C+, C and C- graduate work will be counted toward the degree requirements. Grades of D or F are not accepted for any graduate degree but the grades are used in the determination of the GPA.
4. The program must include a minimum of 70% of the total hours as 7000 level courses.
5. All requirements of the Graduate School and CERI must be met.

### **Thesis Proposal**

A student should prepare a written thesis proposal according to the timeline presented above and present the proposal to the advisory committee after the advisor has approved it. The thesis proposal should conform to the writing standards expressed in the English Competency section above and should include headings such as Abstract, Introduction, Importance of the Project, Method of Approach, Work Plan, and References. The complete proposal, including figures should not exceed 10 pages. A copy of the proposal approved by the committee should be given to the Graduate Program Coordinator.

### **Thesis Defense**

The candidate in consultation with his or her advisor will arrange a date, time and room for a thesis defense. The date must be set when the thesis, in its defensible form, is presented to the student’s advisory committee. The student is responsible for advertising the thesis defense. The Graduate Student Coordinator must be notified of and approve all arrangements.

The M.S. thesis defense presents a needed opportunity for intellectual exchange among the wider geoscience community, as well as an opportunity to learn about graduate student research. As such, approximately one-half hour of the defense, to include an oral presentation and questions from the audience, should be scheduled as a public seminar. The ensuing examination will also be open to the public; an audience may remain in the

room until the time of an executive session for discussion and a vote that is closed to the public and to the candidate. The audience may not ask questions, however, after the public questioning period of the seminar portion of the exam.

The student's advisory committee will conduct the thesis defense and approve the final thesis. By university regulations, all committee members must be present for the defense and the results are determined by a unanimous vote of the committee. If the student fails the examination, or presents an unacceptable thesis, the committee will advise the Graduate Program Coordinator whether the student must submit a revised thesis, or whether the student should be dropped from the M.S. program. Unsuccessful students will normally be given a second chance.

A paper copy of the defended and corrected thesis must be submitted to the Graduate School along with the committee approval form. This copy must contain all corrections given to the student during the final defense.

### **Retention**

A student pursuing the Master's degree may be terminated for any of the following reasons:

- a. Failure to maintain a grade point average of 3.0 or above. A student who has a cumulative grade point average below 3.0 will be placed on probation. The Vice Provost for Graduate Studies must approve continuation in graduate school. Any person whose continuation is denied may appeal the decision to the University Council for Graduate Studies.
- b. Failure to complete the degree requirements within six years of initial enrollment in the graduate program.
- c. Failure to pass the Comprehensive Examination.
- d. Failure to satisfy the advisory committee on the final oral examination.

## **THE DOCTORATE DEGREE**

### **Bypassing the M.S. Degree**

If a student is admitted for the M.S. degree, the degree must be completed through graduation before proceeding to the Ph.D. unless a bypass petition is submitted to the Graduate Program Coordinator. The petition must be written by the student and submitted to the student's M.S. advisory committee and two additional faculty members who have agreed to serve on a Ph.D. advisory committee. All five committee members, signifying that the committee thinks the M.S. degree can be bypassed, must sign the petition. The petition should contain a record of achievement, a definitive statement of research interests, and discussion of background preparation. The Graduate Program Coordinator, in consultation with the Director of CERI, will make the decision to approve or deny the petition. If the petition is approved, the Graduate Program Coordinator will initiate a change-of-status petition with the graduate school.

### **Change of Status Following the M.S. Degree at the University of Memphis**

A student admitted to the M.S. degree program, having completed the M.S. degree through graduation, may continue for the Ph.D. degree if accepted to the program by the faculty. The student must provide a written statement of research interests and letters of recommendation from appropriate faculty. The student will be placed in the normal applicant pool for admission to the Ph.D. program and for financial support.

### **Students Admitted with the M.S. or M.A. Degree**

Students admitted with the M.S. or M.A. degree are expected to have the degree in hand upon arrival. In exceptional circumstances, and with permission from the Graduate Program Coordinator, a student will be admitted to the Ph.D. program if the M.S. or M.A. granting institution certifies that the degree requirements have been completed through graduation.

### **Program Requirements**

A minimum of 72 credit hours of credit beyond the bachelor's degree. The 72 credit hour total is subject to the following restrictions:

1. No more than 12 credit hours at the 6000 level may be counted toward the Ph.D. degree.
2. At least 12 credit hours must be in courses numbered GEOP 7020-7702.
3. A maximum of 36 credit hours for GEOP 9000 (Dissertation) may be counted toward the Ph.D. degree. A minimum of 6 credit hours of GEOP 9000 is required.
4. A maximum of 6 credit hours of GEOP 7621 (Independent Study) may be counted toward the Ph.D. degree.
5. Satisfactory performance on the Qualifying Examination
6. Satisfactory completion of the Comprehensive Examination
7. Submission of two manuscripts to refereed journals.
8. A maximum of 32 hours of graduate course credit completed at the University of Memphis or another accredited institution (including credit applied to a MS degree) may be applied to the 72 hour requirement subject to the approval of the student's advisory committee. A minimum of 9 hours other than GEOP 7621, 7701, 7702, 9000 must be completed at the University of Memphis.
9. The last 30 hours of credit must be earned at the University of Memphis.
10. Successful completion and defense of a dissertation.

### **Time Limitation**

No credit earned more than ten years prior to the student's expected date of completion of the doctoral degree will be applied toward satisfying course requirements for the degree. There are no exceptions to this policy. However, students may request the option of validating old courses as described in the *Academic Regulations* portion of the graduate catalog.

### **Residency**

University rules stipulate that a student must commit to full-time study for a minimum of two successive semesters after admission to the degree program to fulfill the residency

requirement. The purpose of the residency requirement is to provide students with significant time for sustained participation with peers and faculty in scholarly and creative activities. Summer terms will count toward residency for students matriculating through the doctoral program on a part-time basis.

### **The Qualifying Exam**

See Appendix C for a student's guide to the Qualifying Exam.

*Purpose and objectives of the exam:* The Qualifying Exam is meant to determine if the student has the appropriate aptitude and background to be retained in the Ph.D. program. Primary objectives of this exam will be to determine if the student:

- a) Demonstrates an acceptable general level of knowledge in the relevant discipline(s)
- b) Can think critically, logically, and creatively
- c) Can develop tractable research goals independently
- d) Can communicate effectively

*When:* The Qualifying Examination will be given just before the beginning of the third semester of residence, on or before a date set by the Graduate Program Coordinator.

*The abstract:* An important aspect of the Qualifying Examination is to test the ability of the student to develop a testable scientific question or hypothesis and structure a research plan. At least one week prior to the examination date, a Ph.D. student will submit to the permanent committee a one page abstract describing an original research proposition. The subject of the proposition may or may not become part of the student's dissertation. The abstract should identify an unresolved scientific question or hypothesis, provide a brief review of relevant background material to motivate the research, and describe a feasible analytical approach. The abstract will not, in general, describe a completed research project, and cannot be a presentation of completed master or senior thesis level research. The topic of the proposition should be limited in scope; it should not be confused with the Ph.D. Dissertation Proposal. The independent formulation of the proposition and related abstract is critical, but discussion of the feasibility of the idea with others, such as the student's advisor and other students, is allowed.

*Content of the exam:* The exam will begin by the student giving a 15 to 20 minute presentation of the material in the abstract. An oral exam will follow. The combined length of presentation and oral exam will not exceed two hours. The student should present enough material to motivate the research and demonstrate that the proposed approach is feasible. The student is encouraged to conduct a thorough literature search and be prepared to answer questions that address the specifics of the proposition and the fundamentals underlying the general area of research covered in the proposition. The oral exam will not be restricted to the proposal topic, but it is not a test for comprehensive knowledge of the student's expected dissertation field. The committee can invite any member of the graduate faculty to be an observer in the exam.

*Grading:* The committee will assess the following: 1) the ability of the student to pose and write about a research problem; 2) presentation of the research problem; 3) ability to reason through complex questions during discussion; and 4) appropriateness of background knowledge. At the conclusion of the examination, the committee will vote by ballot to

a) Pass

b) Fail

Simple majority vote rules, with a minimum of five committee members present.

In extreme cases, a substitute can be designated through consultation with the Graduate Program Coordinator, which is necessary in order to secure Graduate School approval of the substitution. In the event of a tie, the outcome is failure.

If the student does not pass on the first attempt, the exam can be taken a second time at the beginning of the fourth semester. Two failures will result in removal from the Ph.D. program. In all cases, recommendations may be made to remove deficiencies in background by coursework or reading

### **The Comprehensive Examination**

*Purpose of the exam:* The comprehensive exam tests the student's overall understanding of geophysics and is based largely upon the courses taken while in the graduate program. This includes courses taken in the Masters program at CERL.

*When:* The Comprehensive Examination will be given after completion of all basic required course work and must contain both written and oral components. Normally, the exam will be given just before the beginning of the fifth semester of residence, on or before a date set by the Graduate Program Coordinator.

*Content of the exam:* The student will take a one day, 6 hour written examination followed by an oral examination. The written portion of the exam will be compiled by the dissertation advisor based upon a selection of questions (and answers) provided by faculty members who taught the courses taken by the student. The student's committee will determine the courses covered in the exam during the normally scheduled committee meeting held in the second spring term for fall admissions and the second fall term for spring admissions. Normally, six courses will be covered in the exam. Students are encouraged to discuss the nature and content of the questions to be asked with the faculty members supplying the questions. The oral exam will be taken no later than two days following the written exam and will be broad in nature; questions in the oral exam do not have to stem from questions asked in the written portion of the exam and should not be used as an opportunity for the student to answer specific questions missed in the written portion of the exam. The oral exam will not exceed two hours.

*Grading:* The committee members will grade the written exam using answers provided by the faculty members supplying the questions and discuss the overall performance of the student. In general, a student will have to receive a grade of 60% or higher on the written portion of the exam to pass. If a majority of the committee members vote pass,

recommendations may be made to remove deficiencies in background by coursework or reading. In the event of a tie, the outcome is a failure and the committee may recommend completion of a M.S. thesis followed by a reexamination, or a second examination at the option of the student. A second failure of the Comprehensive Exam results in termination.

The advisory committee has the responsibility of determining that a student has removed any deficiencies revealed by the Comprehensive Examination. This judgment will be based upon performance in the assigned remedial courses and will be a discussion item in committee meetings. It will be the responsibility of the thesis advisor to gather all pertinent material for the evaluation.

### **Submission of Manuscripts to Refereed Journals**

Each Ph.D. student is required to be an author on two manuscripts submitted to refereed journals. The student does not have to be first author on either manuscript to fulfill this requirement but must be first author on any manuscript included in his/her dissertation. Both manuscripts must be submitted prior to filing for admission to candidacy.

### **Degree Requirements**

The Ph.D. candidate must satisfy Graduate School requirements including the residency requirement, passing of examinations, and preparation and defense of a dissertation. Check the Graduate School website for specific instructions regarding University forms and deadlines. The candidate must also satisfy requirements imposed by CERI. The advisory committee is responsible for ensuring that the candidate has developed scientific breadth and depth by a combination of course work and personal study. This ability is tested mainly by the Comprehensive and Qualifying examinations.

### **Dissertation Proposal**

A doctoral candidate should prepare a written dissertation proposal by the end of the second spring semester (June 1) for fall admission and by Fall Break in the second fall semester for spring admission. The proposal must be read and approved by the advisor prior to distribution to the advisory committee. The dissertation proposal should include headings such as Abstract, Introduction, Importance of the Project, Method of Approach, Work Plan, and References. The complete proposal, including figures should not exceed 12 pages. A copy of the proposal approved by the committee should be given to the Graduate Student Coordinator.

### **Formal Oral Presentation**

Each doctoral student is required to present at least one formal talk at CERI during the 5th semester in residence discussing his/her research topic. Usually, this talk will be a “brown bag” and should make use of appropriate visual aids. The purpose of the talk is to familiarize others at CERI with the dissertation research, receive appropriate feedback from CERI members that may serve to strengthen the dissertation, and provide practice in

public speaking for the student. This talk is not intended to constitute an oral defense of the dissertation research.

### **Admission to Candidacy**

This usually occurs at the start of the last semester of residence. The following requirements apply:

1. The student must submit a graduation application (“Apply to Graduate”) to the Graduate School for final approval by the deadline indicated on the Graduate School web site. This application is available in the student’s MyMemphis account.
2. The student must also file a “Doctoral Degree Candidacy Form” with the Graduate School by the deadline indicated in the Graduate School web site.
3. An approved Dissertation Proposal form must be filed with the Graduate School.
4. The student must have a cumulative GPA of 3.0 or higher in all graduate courses taken at the University of Memphis. No more than 7 hours of C+, C and C- graduate work will be counted toward the degree requirements. Grades of D or F are not accepted for any graduate degree.
5. All requirements of the Graduate School and CERI must be met.

### **Doctoral Dissertation Defense**

When the candidate has prepared the dissertation, a date, time and room for a dissertation defense (final oral examination) will be selected. It is the responsibility of the candidate to determine that the examination date and time are acceptable to all members of his or her advisory committee. The Graduate Student Coordinator must be notified and must approve all arrangements. The student must advertise the dissertation defense at least one week in advance. Notification should go out to all members of CERI and to other departments (e.g. Civil Engineering, Earth Sciences) as appropriate for the dissertation topic.

The advisory committee will conduct the final oral examination. The dissertation defense presents a needed opportunity for intellectual exchange among the wider geoscience/engineering community, as well as an opportunity to learn about graduate student research. As such, approximately one-half hour of the defense, to include an oral presentation and questions from the audience, should be scheduled as a public seminar. The ensuing examination will also be open to the public; an audience may remain in the room until the time of an executive session that is closed to the public and to the candidate. The audience may not ask questions, however, after the public questioning period of the seminar portion of the exam.

By University regulations, all members of the advisory committee must be present for the final oral examination and a unanimous positive vote is required for a successful dissertation defense. All members of the advisory committee must approve the final draft of the dissertation. The final draft must contain all corrections given to the student during the defense and must be submitted to the Graduate School following the defense by a date specified on the Graduate School web site. If the student fails the final oral examination, or presents an unacceptable dissertation, the committee will provide advise

to the Graduate Program Coordinator regarding remedial action. Unsuccessful students will normally be given a second chance.

### **Retention**

A student pursuing the doctoral degree may be terminated for any of the following reasons:

- a. Failure to maintain a grade point average of 3.0 or above. A student who has a cumulative grade point average below 3.0 will be placed on probation. The Vice Provost for Graduate Studies must approve continuation in graduate school. Any person whose continuation is denied may appeal the decision to the University Council for Graduate Studies.
- b. Failure to pass the Qualifying exam.
- c. Failure to pass the Comprehensive Examination.
- d. Failure to make satisfactory progress towards completion of the degree in a timely manner, as determined by the student's advisory committee.
- e. Failure to satisfy the advisory committee on the final oral examination.

## **FACILITIES AND SERVICES**

### **Field Deployment Laboratory**

The Field Deployment Laboratory is housed in the garage behind the third house. This laboratory contains portable field instruments and associated equipment. Do not use or remove equipment from this laboratory without permission from Chris McGoldrick. See the CERI Policy Manual for further conditions regarding use of the equipment.

### **Graduate Student Computer Laboratory**

The computer laboratory is located in the Long Building and is available 24/7 to all CERI students. Report any problem encountered to the computer staff; please do not attempt to fix problems yourself. Computer staff members will be available during posted times to provide assistance. The computer laboratory is intended for the use of CERI students and others given computer accounts. Please do not allow students without CERI accounts to use the facilities. Please see the CERI Policy Manual for a complete description of the computer policy.

### **Student Offices**

Each student will be assigned office space by the Graduate Student Coordinator. In most cases, M.S. students will be assigned space in the graduate area in the Long Building. Ph.D. students will be relocated to more private areas as space becomes available. Please respect the need for a quiet work area. Discuss any problems related to office space and the working environment with the Graduate Program Coordinator.

## **Graduate Student Mail**

Graduate student mailboxes are located in the copy room in House 2. Personal mail may not be placed in the “out” boxes at CERI and students should not use the CERI address for any personal mail.

## **Telephones**

Under normal circumstances, students will not be provided with an access number allowing them to make long distance calls. If such calls must be made for the purposes of conducting research, an access number can be obtained. Telephone charges should be paid by the grant funding the student’s research project. All long distance personal calls must be charged to a personal phone card or to a special account number obtained for personal calls from the telecommunications office.

## **Office Supplies**

Various office supplies are kept in stock in houses 1, 2, and 3. Students are permitted to use these supplies for research and course work. Students should be conservative in their use of supplies; anyone using excessive amounts will be asked to supply their own material.

## **Duplicating Machines**

Duplicating machines were acquired primarily for the use of faculty and staff in the duplication of illustrative material and hand-outs for regularly scheduled courses, critical administrative material, and proposal material. Personal copying on research or CERI accounts is not permitted, and, if done, may lead to legal action by the University (theft of services). In particular, copying copyrighted books is not permitted.

## **Keys**

Two keys will be issued to each student. These keys open the doors to houses 1 through 3 and the Long building. Keys may be obtained in the staff office, House 2. Keys must be returned when a student leaves CERI permanently.

## **CERI Vehicles**

CERI vehicles may be used by students for research related trips, meetings, or other CERI-related business. Drivers must meet all requirements for operation of University vehicles, including a valid U.S. driver’s license, and must be on the University payroll at the time of use. Vehicles must be signed out with the secretary in House 2. The keys and credit cards are available there and must be returned after use. It is the responsibility of the driver to return the vehicle in a clean condition and filled with gas. Smoking is not permitted in CERI vehicles. Any abuse of the vehicle policy, in particular using a vehicle without notifying the secretary in House 2, may result in the use of vehicles being denied to the offender.

Note – the University does not cover personal liability for drivers of university vehicles. This means that, in the case of an accident, you will be responsible for covering personal injury costs. Please see the CERI Policy Manual for the complete description of the vehicle policy.

### **Parking**

A parking tag must be obtained from the parking office. Any vehicle parked at CERI without a valid parking tag will be subject to ticketing by the University. This includes summer terms.

## **GRADUATE STUDENT COMMITTEES**

### **SEG Student Chapter**

<http://www.seg.org/education/university-student-programs/student-chapters/about>

The University of Memphis Geophysical Society is an official student chapter of the Society of Exploration Geophysicists (SEG). We are affiliated with the world's largest society of applied geophysics, and are a registered student organization at the University of Memphis. The Geophysical Society serves as a platform between you and the geoscience profession. Membership is free--available to anyone who is a full-time graduate or undergraduate student and in good standing at the University of Memphis.

There are many benefits that come with membership to an SEG student chapter. We organize fun events, host guest speakers, and participate in outreach opportunities to further educate the public about the geosciences. By being a member, you will join a worldwide community of like-minded students, many of whom will one day be leaders in fields related to the geosciences. The professional contacts and friendships you make as a member of the Geophysical Society may follow you in your future career as a geoscientist. Additionally, as a member of an SEG student chapter, you may get opportunities to travel to the annual SEG meeting and student expo, where you can meet with and learn from world-class experts from science and industry.

SEG student chapters give you the chance to enhance your education, jump-start your career, and build ties with the new generation of up-and-coming international geoscientists. The opportunities that come from belonging to an SEG student chapter will benefit you for years to come!

**Graduate Student Association Membership and Graduate Leadership Council** – All graduate students are automatically members of the Graduate Student Association. Every fall, two graduate students from CERI will serve on the Graduate Leadership Council. Selection of the two representatives will be by majority vote of the graduate students. Please see <http://www.memphis.edu/gsa/about.php> for more details.

**Graduate Student Colloquium Committee** – (Organized through the SEG Student Chapter) The purpose of this committee, composed solely of students, is to organize and

publicize seminar and brownbag talks at CERI. This committee (one chair and a minimum of 3 members) should solicit speakers, reserve room space and equipment, and publicize the talks.

**CERI Faculty Meeting Representative** – Two graduate students attend CERI faculty meetings in order to express student opinions and concerns and to ensure that graduate students are kept informed of decisions made or considered which might affect them. Unless specifically invited, the student representatives will not attend closed faculty meeting sessions. The graduate student representatives will be selected by a majority vote of the graduate students.

**Standing CERI Committees** – several standing committees will have student representatives. These include the Academic Program Committee, Computer Committee, Education and Outreach Committee, and the Website Committee. Please let the Graduate Program Coordinator know if you have a desire to serve on one of these committees.

## Appendix A

### CERI GRADUATE PROGRAM CHECKLIST MS Degree

NAME:

DATE ENTERED:

1. *Meet with Preliminary Advisory Committee during registration of the first semester to review previous training and proposed program of study. Complete Program Planning form with committee.*

NOTE: Any modification to academic program hereafter must be approved by the committee and an updated Program Planning form, signed by the committee and dated, must be submitted to the Graduate Coordinator for your file.

2. **Select Major Advisor and Thesis Committee.** The Preliminary Advisory Committee will be dissolved at the start of Spring Break (start of 1<sup>st</sup> fall semester for spring admission). You must select your Major Advisor and Advisory Committee by this time and no later. If you fail to do this, the Graduate Program Coordinator will assign a Major Advisor and Advisory Committee to you. **Submit completed and signed Thesis/Dissertation Advisory Committee form to Michelle Smith for signatures.**

3. **Complete Progress Report Form** (this form) with your advisor. This is an evaluation of the student's progress and serves as the student's request for assistantship appointment or reappointment. Submit report to Michelle Smith by **mid- December** each year.

4. **Write a thesis proposal** by June 1 for fall admission and Fall Break for spring admission in consultation with the Major Advisor. Give a copy of the proposal to the members of your Advisory Committee after the Advisor has approved a draft. Allow several days for the committee members to read the proposal. Meet with the Advisory Committee to discuss the thesis proposal and/or any modification of course program. Submit approved copy of proposal, Thesis/Dissertation Proposal Approval Form signed by the committee and dated, to Michelle Smith.

5. **Complete courses to remove undergraduate deficiencies** by the end of the first year in residence.

6. **Take the Comprehensive Exam** before the start of classes for the third semester.

7. **Give a "brown bag"** discussing your research project to members of CERI before the end of the third semester. The purpose of the "brown bag" will be to inform others about the scope and nature of your research project and to receive constructive criticism.

8. **Complete graduate course work** (32 hours).

- Completion of 12 semester hours of CERI coursework
- Completion of elective graduate coursework
- Completion of at least 23 hours of coursework at or above the 7000-level (including thesis)
- 3 semester hours of graduate Seminar coursework
- Minimum of 6 semester hours of CERI7996 (Thesis). (This course may not be taken until the student has passed the Comprehensive Exam).
- Only 6 hrs. of CERI7621 (Independent Study) may be applied to the degree.

For the non-thesis option only:

- \_\_\_ Two additional CERI 7000 level courses
- \_\_\_ Submit a paper for publication in a refereed journal earning 3 hours of CERI 7621 (Independent Study)
- \_\_\_ CERI 7996 (Thesis) credit may not count toward the degree

- \_\_\_ **9. Complete and submit all required graduation documents** at or before the start of your graduation semester to apply for graduation. Submit “Intent to Graduate Card” online. Complete “Master’s Candidacy Form” and give to Michelle Smith. Form will be reviewed by the CERI Graduate Program Coordinator and returned to you for Advisory Committee signatures. **After the form has been signed by the committee, return to Michelle Smith for all other signatures.** (See CERI Internal website for graduation forms).
- \_\_\_ **10. Check Graduate School Graduation deadline calendar** on Graduate School website for thesis defense submission deadlines.
- \_\_\_ **11. Submit advisor approved thesis draft** to your Advisory Committee at least 2 weeks prior to a defense date for review.
- \_\_\_ **12. Create Thesis/Dissertation Approval Page** on cotton paper.
- \_\_\_ **13. Defend Thesis.**
- \_\_\_ **14. Make final corrections to thesis** and submit paper copy of thesis and the signed Thesis/Dissertation Approval Form to the Graduate School before first deadline (Check Graduate School Graduation deadline calendar and visit CERI Internal website for Thesis/Dissertation Preparation Guide). (Make sure a copy of the signed Thesis/Dissertation Approval Page is given to Michelle Smith)
- \_\_\_ **15. Receive thesis from Graduate School** and make necessary changes.
- \_\_\_ **16. Submit corrected copy of your thesis** to the Electronic Thesis and Dissertation archival system.

In addition to the above, please list all of your publications including submitted articles and abstracts for this year to Chris Powell for our CERI website database.

Advisor signature: \_\_\_\_\_

Revised 10/06/14

**CERI GRADUATE PROGRAM CHECKLIST**  
**Ph.D. in Earth Sciences**

NAME:

DATE ENTERED:

1. *Meet with Preliminary Advisory Committee during registration of the first semester to review previous training and proposed program of study. Complete Program Planning form with committee and give to Michelle Smith.*

NOTE: Any modification to academic program hereafter must be approved by the committee and an updated Program Planning form, signed by the committee and dated, must be submitted to the Graduate Coordinator for your file.

2. **Select Major Advisor and Advisory Committee** as soon as possible. The Preliminary Advisory Committee will be dissolved at the start of Spring Break (start of 1<sup>st</sup> fall semester for spring admission). You must select your Major Advisor and Advisory Committee by this time. If you fail to do this, the Graduate Program Coordinator will assign a Major Advisor and Advisory Committee to you. **Submit completed and signed Thesis/Dissertation Advisory Committee form to Michelle Smith for signatures.**

4. **Complete Progress Report Form** (this form) with your advisor. This is an evaluation of the student's progress and serves as the student's request for assistantship appointment or reappointment. Submit report to Michelle Smith by **mid-December** each year.

5. **Complete Qualifying Exam** before the start of classes for the third semester. This consists of a one page abstract, a 15 to 20 minute presentation, and a 2 hour oral exam.

6. Write a dissertation proposal before the end of your fourth semester (June 1 for fall admission; start of the 2<sup>nd</sup> fall semester for spring admission) in consultation with the Major Advisor. Give a copy of the proposal to the members of your Advisory Committee after the Advisor has approved a draft. Allow several days for the committee members to read the proposal. Meet with your Advisory Committee to discuss the dissertation proposal and/or any modification of course program. Submit approved copy of proposal, Thesis/Dissertation Proposal Approval Form signed by the committee and dated, to Michelle Smith.

7. **Give a "brown bag"** discussing your research project to members of CERI during the 5<sup>th</sup> semester of residence. The purpose of the "brown bag" will be to inform others about the scope and nature of your research project and to receive constructive criticism.

8. **Complete Required Graduate coursework**

- No more than 12 post-baccalaureate hours of 6000-level courses may be applied to the Ph.D.
- 12 hours of CERI 6101-7702 coursework

9. **Complete Comprehensive Exam** before beginning of 5<sup>th</sup> semester. This consists of both a written and an oral exam.

- \_\_10. **Complete All Graduate coursework and requirements** (minimum of 72 hours beyond bachelor's degree or a minimum of 40 semester hours beyond the master's degree).
- No more than 12 post-baccalaureate hours of 6000-level courses may be applied to the Ph.D.
  - 12 hours of CERI 6101-7702 coursework
  - Maximum of 6 hours of CERI 7621 (Independent Study)
  - Minimum of 9 hours and a maximum of 32 hours of CERI 9000 (Dissertation). This course may not be taken until the student has passed the Comprehensive Exam.
  - Author on two manuscripts submitted to refereed journals.
- \_\_11. **Complete and submit all required graduation documents** at or before your graduation semester to apply for graduation. Submit "Intent to Graduate Card" online. Complete "Doctoral Candidacy Form" and give to Michelle Smith. Form will be reviewed by the CERI Graduate Program Coordinator and returned to you for Advisory Committee signatures. **After the form has been signed by the committee, return to Michelle Smith for all other signatures.** (See CERI Internal website for graduation forms).
- \_\_12. **Check Graduate School Graduation deadline calendar** on Graduate School website for dissertation defense submission deadlines.
- \_\_13. **Submit an advisor approved draft of your written dissertation** to your Advisory Committee at least two weeks prior to a defense date.
- \_\_14. **Defend Dissertation.**
- \_\_15. **Make final corrections to dissertation** and submit a paper copy of the dissertation and the signed Thesis/Dissertation Approval Form to the Graduate School before first deadline (Check Graduate School Graduation deadline calendar and visit CERI Internal website for Thesis/Dissertation Preparation Guide). (Make sure a copy of the signed Thesis/Dissertation Approval Page is given to Michelle Smith)
- \_\_16. **Receive dissertation from Graduate School** and make necessary changes.
- \_\_17. **Submit corrected copy of your dissertation** to the Electronic Thesis and Dissertation archival system.

In addition to the above, please list all of your publications including submitted articles and abstracts for this year to Chris Powell for our CERI website database.

Advisor signature: \_\_\_\_\_

Revised 10/06/14

## Appendix B Progress through the Program

### M.S. Deadlines

Task	Fall Admission	Spring Admission
Meet with temporary committee	August	January
Select major advisor and permanent committee	Spring Break 1 <sup>st</sup> spring semester	Start of 1 <sup>st</sup> fall semester
Write Thesis proposal and obtain advisory committee approval; submit to Graduate Program Coordinator (thesis option only)	End of the first spring semester (June 1)	Fall Break 1 <sup>st</sup> fall semester
Comprehensive exam	Just before start of the 2nd fall semester	Just before start of 2nd spring semester
Brownbag talk	During the 2 <sup>nd</sup> fall semester	During the 2 <sup>nd</sup> spring semester
Fill out intent to graduate and candidacy forms	Start of the 2nd spring semester	Start of the 2nd fall semester
Complete all graduate course work and requirements	End of 2 <sup>nd</sup> spring semester	End of 2nd fall semester
Defend thesis	End of 2nd spring semester	End of 2nd fall semester
Submit all necessary documents to the Graduate School	End of 2nd spring semester	End of 2nd fall semester

### Ph.D. Deadlines

Task	Fall Admission	Spring Admission
Meet with temporary committee	August	January
Select major advisor and permanent committee	Spring Break 1 <sup>st</sup> spring semester	Start of 1 <sup>st</sup> fall semester
Qualifying exam	Just before start of the 2 <sup>nd</sup> fall semester	Just before start of 2 <sup>nd</sup> spring semester
Write Dissertation proposal and obtain advisory committee approval; submit to Graduate Program Coordinator	End of the second spring semester (June 1)	Start of the 2nd fall semester
Comprehensive exam	Just before start of the 3rd fall semester	Just before start of 3rd spring semester
Brownbag talk	During the 3 <sup>rd</sup> fall semester	During the 3 <sup>rd</sup> spring semester
Submit two manuscripts for publication in refereed journals	Before start of the 4 <sup>th</sup> spring semester	Before start of the 4 <sup>th</sup> fall semester
Fill out intent to graduate and candidacy forms	Start of 4 <sup>th</sup> spring semester	Start of 4 <sup>th</sup> fall semester
Complete all graduate course work and requirements	End of 4 <sup>th</sup> spring semester	End of 4 <sup>th</sup> fall semester
Defend dissertation	End of 4 <sup>th</sup> spring semester	End of 4 <sup>th</sup> fall semester
Submit all necessary documents to the Graduate School	End of 4 <sup>th</sup> spring semester	End of 4 <sup>th</sup> fall semester

## Appendix C

### Student's Guide for the Ph.D. Qualifying Exam

Purpose of the exam: A Ph.D. student is someone who should be able to think creatively and possess the ability to advance the science. This is a significant difference from a Masters student where, in working toward a Masters degree, the student learns how to conduct independent research. The Ph.D. student takes this ability one step further and advances our knowledge in a significant way. The purpose of the Ph.D. qualifying exam is to demonstrate to the faculty that you have the inherent ability to be a Ph.D. student. What are the faculty members evaluating? The faculty members are trying to determine if you have the ability to think and reason independently, understand what a valid research problem is and how to begin solving it, and if you have the potential to complete a Ph.D. degree.

#### How do you prepare for the exam?

1. The most important step is to do well in your classes and provide everyone with a favorable impression of your capabilities. In reality, you are being evaluated at all times by the faculty.
2. Think about what you are reading and being taught. You will be told on many occasions that “this is an unsolved problem” or, “we really do not understand this concept completely”. When you hear expressions like this, think about how you would approach the problem. A fresh, creative mind like yours may have an insight.
3. Discuss scientific issues with your fellow students and with faculty members. Often, very interesting ideas come out of seminar discussions. Be sure to attend colloquium talks and participate in the discussions that follow.

The abstract: This is critical to your success because it is your opportunity to set up the problem that will receive the most attention during the exam. The abstract should contain a concise statement of what you are proposing as a solution to a problem or new approach to evaluating a problem. Your chosen topic should not be something you know very little about because you will not be able to answer any question posed to you in depth. The faculty will see through this immediately. Your topic should not rely too heavily upon research you are conducting closely with your advisor. This is your exam, not your advisor's exam, and you do not want what you are proposing to depend critically upon your advisor's reasoning or results. You must demonstrate that you can think independently. Coming up with a topic through discussion with your advisor is very good but you must pursue the problem on your own.

#### Steps to follow when the exam is approaching:

1. Select a topic for the abstract and ask your advisor and other faculty members if the topic is appropriate. The topic does not have to be related to your dissertation research.
2. Write a draft of the abstract and give this to your advisor for comments.
3. Give a copy of the abstract to your committee members at least one week in advance of the exam.
4. Put together a 15 to 20 minute presentation describing the problem you are addressing. Remember – you do not have to show results proving that your

- approach to solving a problem is correct. You just have to present the concept and why what you are proposing is feasible. You can mention past studies, past approaches and data, new data that you would need, etc.
5. GIVE YOUR PRESENTATION TO YOUR FELLOW STUDENTS!! This is important. The students will let you know if your slides need improvement, if you are presenting a logical argument and if you need to add or subtract things from the presentation. They will also ask you some good questions – probably similar to those that you will get from the faculty. This is the best way to practice your talk.
  6. Do not give your presentation to your advisor.
  7. Get a good night's sleep prior to the exam.

### Abstract Examples

#### “Good Abstract”

The Origin of Gravity Lows Associated with the New York - Alabama Magnetic Lineament in the Eastern Tennessee Seismic Zone

I propose that distinct gravity lows associated with a prominent positive magnetic lineation in the eastern Tennessee seismic zone (ETSZ) are the result of flexure of the crust below a massive mafic intrusion rather than the presence of unusual low density, high magnetic susceptibility rocks. The northeast-southwest trending ETSZ is bounded on the northwest by a prominent, positive magnetic anomaly called the New York – Alabama (NY-AL) magnetic lineament. A distinct, low Bouguer gravity anomaly is associated with the NY-AL lineament which is difficult to explain in terms of rock material properties; normally, high susceptibility rocks have high densities and should produce Bouguer gravity highs. Previous studies have attributed the high magnetic – low gravity feature to the presence of unusual rocks but these arguments are unconvincing. A more plausible explanation for the gravity lows is that they are the result of downward flexure of the crust in response to the emplacement of very dense, mafic rocks in a Keweenawan -age failed rift that lies close to and parallels the northwest boundary of the ETSZ. Close examination of the Bouguer gravity map for the region reveals the presence of linear, low anomalies on either side of the failed rift, as would be expected by a flexural downwarp of the crust. One of these linear, low gravity anomalies corresponds to the NY-AL magnetic lineament. Seismic reflection profiles also indicate a downwarping of the crust next to the failed rift. Drill holes have penetrated the mafic rocks, providing good estimates of density. The spatial extent of the failed rift can be determined from associated strong, positive gravity anomalies. I will investigate my hypothesis by modeling the flexural effects of the crust in response to the load of the failed rift mafic intrusion and then determining the overall effect on the gravity field.

#### “Bad abstract”

The Origin of Gravity Lows Associated with the New York - Alabama Magnetic Lineament in the Eastern Tennessee Seismic Zone

The northeast-southwest trending eastern Tennessee seismic zone (ETSZ) is bounded on the northwest by a prominent, positive magnetic anomaly called the New York – Alabama (NY-AL) magnetic lineament. A distinct, low Bouguer gravity anomaly is associated with the NY-AL lineament which is difficult to explain in terms of rock

material properties; normally, high susceptibility rocks have high densities and should produce Bouguer gravity highs. Previous studies have attributed the high magnetic – low gravity feature to the presence of unusual rocks but these arguments are unconvincing. I will explore all available geophysical and geological data to determine if there is a more plausible explanation for the association of low gravity anomalies with the NY-AL lineament. I will model the potential field data (both gravity and magnetics) using forward and inverse techniques and I will conduct a literature search for other associations of strong high magnetic anomalies with gravity lows. I will then extend my research to examine why the potential field anomalies appear to bound the northwestern side of the ETSZ.

Analysis:

Why is the “good” abstract good?

1. You have identified a problem that does not have a clear explanation – the association of gravity lows with magnetic highs along the northwest boundary of the ETSZ.
2. You have provided a possible solution to the problem. This is key.
3. You have provided enough information to make the reader think your idea is feasible.
4. Your proposed solution can be tested.
5. You have identified what data sets are available that will assist your research.

Why is the “bad” abstract bad?

1. Although you have identified a problem that does not have a clear explanation, you have provided no possible solution.
2. You have not identified which data sets are important to the solution of this problem other than gravity and magnetic data.
3. The abstract indicates a long-term research project that goes beyond the explanation of the association of low gravity anomalies with the NY-AL magnetic lineament.