IU GEOLOGICAL SCIENCES GRADUATE HANDBOOK 2013-2014

TABLE OF CONTENTS

GRADUATE COMMITTEE

Role of the Graduate Committee

The Graduate Committee is responsible for administration of admissions, academics, and other advisory issues for graduate students in the department. The committee acts on applications for associate instructorships, fellowships, and summer research support and monitors academic progress of students. The committee consists of faculty members chosen to represent a range of disciplines and research fields in the department. The committee is assisted in its work by Mary Iverson, Graduate Secretary.

Current members of the committee are:

Dr. Gary Pavlis- Director of Graduate Studies; Dr. Simon Brassell; Dr. Ed Ripley

Please contact the Director of Graduate Studies at: geodgs@indiana.edu

Please contact Mary Iverson at: miverson@indiana.edu

General Information for All Graduate Students

Degrees Offered

The following graduate degrees are offered In the Department of Geological Sciences: MS Geology, MS Geology-Atmospheric Sciences, Ph.D Geology, Ph.D Geology-Atmospheric Sciences.

Residency

All graduate students must complete at least 30 hours of graduate credits in residence at the IU Bloomington campus. Ph.D students must be in residence at the Bloomington campus for at least two consecutive semesters during the degree program.

IUB College Information

Visit the College's website, including the College Graduate Office page, frequently. (Web address: http://www.indiana.edu/~college/graduate/dean.shtml). Use the links on the College Graduate Office page to submit requests (Extensions of Incomplete, Family and Medical Leave), to apply for funding (College Travel Awards, College of Arts and Sciences Dissertation Year Research Fellowships), and to appoint your Doctoral Advisory Committee.

Selection of Advisors and Research Committee

The Graduate Committee will advise each new graduate student on course selection until a primary advisor is selected. Students should choose a primary advisor from the graduate faculty within the Department of Geological Sciences or the Indiana Geological Survey www.igs.indiana.edu. If the primary advisor is from the Indiana Geological Survey, a co-advisor from the Department is required (Appendix 1).

A Research Committee will oversee the student's academic and research progress toward the degree. For all degrees, the majority of members of the research committee must be selected from within the Department of Geological Sciences. The field of expertise of both the primary advisor and the research committee should reflect the topic of research chosen by the student.

Communication with Research Committee

Students must keep members of their Research Committee informed of progress with research and fulfillment of academic requirements on a regular basis, through both meetings and e-mail. Meetings should occur at least once each semester of the academic year (Spring and Fall), although students are strongly encouraged to meet more frequently with their committee members on an informal basis.

Annual Review

An Annual Review of academic and research progress is required of all graduate students in the department. All students are to submit the completed Annual Review forms by April 15 to the Oncourse Grad Student Site. The Graduate Committee may require a student to submit forms earlier than the April 15 deadline as the need arises. Appendices 2 and 3 contain sample copies of M.S. and Ph.D. Annual Reviews. Forms are available on the departmental website under the Education tab and by following links to the Graduate Handbook Appendices. Completion of the Annual Review forms requires a meeting of the student with the research committee and signatures from committee members and student. Students must scan all pages of the review, including the signed forms, and submit as one PDF to the Oncourse Grad Student Site. Students who fail to complete their annual review or whose review is unsatisfactory may be placed on academic probation. While on academic probation, a student cannot be supported as an AI, RA, or Fellow.

Sources of Funding

The Department of Geological Sciences awards AI, RA and Fellowship support, as well as summer research funds, on a competitive basis. AI support includes preparing for and teaching laboratory courses, among other duties. RA support is dependent on specific research funds procured by individual faculty members through externally-funded grant proposals. Fellowships and summer research support are available from assets allocated to general or specific departmental accounts.

Diplomas

Degrees are granted every month of the year. The University Graduate School requires receipt or an electronic copy of the thesis/dissertation prior to the 10th of the month for which the degree is to be granted; if received after the 10th the degree will be granted the next month. Three bound copies are required for the department. A degree diploma is mailed to a student's home address two to three months after the degree is conferred. Diplomas are sent third-class mail through the US Postal Service. Please be aware that third-class items are not forwarded to a new address. In this regard, students must verify that the correct permanent home address is on file with the Registrar in order to have the degree mailed to the desired location. Please see Mary Iverson if you are an international student desiring special arrangements for receipt of the diploma. Mary can instruct you to have the diploma sent from the University Graduate School to the Geology Graduate Office (GY-127). Our department will then send the diploma by airmail to your international address. Duplicate diplomas may be obtained through the Registrar for an additional fee.

Master of Science Thesis Overview

This degree option is recommended for most students. The degree requirements include:

Total of 30 credit hours

- At least 22 of the 30 hours must be graduate-level courses. 400-level courses from the Department of Geological Sciences that can be taken for graduate credit are listed in Appendix 8. 500- 700-level Geology courses and lower-level courses from other departments that count toward graduate credit can be found in the University Graduate School Academic Bulletin (see the section entitled Graduate Credit-General in the Academic Regulations section of the University Graduate School Academic Bulletin).
- 12 of the 22 hours must be from the Department of Geological Sciences.
- A minimum of 3 credits of G810 (research credits) are required; a maximum of 8 credits of G810 can be applied toward the degree.
- At least three 3-credit hour courses of 500 level or above must be taken from the Department of Geological Sciences.
- Selection of courses must be approved by the primary advisor in consultation with the student's research committee.

Transfer of credit — up to 8 credit hours of graduate classes can be transferred from another institution, provided the classes meet the requirements of equivalency of graduate classes offered at IU and a grade of 'B' or higher was achieved. Pass/Fail or 'S' graded classes cannot be transferred. Requests for transfer of credit hours originate with the student and advisor, then Graduate Committee. Students will be required to highlight on a copy of their transcripts the specific courses they request for transfer and bring the transcript to the Graduate Office GY 127. Transfers have to be approved by the University Graduate School and courses must have been completed within 5 calendar years prior to awarding of the Masters degree

Minimum Grade Point Average — All Master's students must maintain a 3.0 (B) grade point average Students with a GPA less than 3.0 can be placed on academic probation until the student's GPA increases to above 3.0. While on academic probation, the student cannot be supported as an AI, RA, or Fellow. If the GPA does not reach 3.0 in the two following semesters, he/she will be required to leave the graduate program.

Primary Advisor — an advisor (and co-advisor if necessary; see above) should be selected no later than March 1st of the first year in the degree program.

Research Committee — A three-person research committee must be formed for each Master's student, consisting of the primary advisor and two other members. Two of the members of this committee must be graduate faculty in the department (see page 3). The composition of the research committee and signatures from each of the members must be filed with the Departmental Graduate Office by April 1st of the first year of the degree program. Any change must be communicated immediately to the Graduate Secretary.

Completion of written thesis — The thesis should be prepared in a form that is essentially ready to submit for publication in an appropriate journal(s). Publication of results is strongly encouraged. The format of the thesis must conform to the University's official policy on the production of theses (Appendix 4). Appendix 5 contains an example of a student's Master's thesis production.

Timeframe — Master's Degrees must be completed within five years of enrollment, or six years for Dual Masters degrees. Students who exceed this time frame must revalidate coursework.

M.S. Requirements — Students in the M.S. degree program who apply successfully for admission into the Ph.D program in our Department must complete all formal requirements for the degree no later than one semester after entering the Ph.D program.

Application for Advanced Degree Form — This form, obtained from the Graduate Secretary, must be completed and submitted a minimum of 60 days prior to desired graduation date, regardless of whether you will attend the commencement ceremony.

Commencement ceremony — If you wish to attend the commencement ceremony, paperwork must be filled out in advance. To attend the December commencement, forms must be filled out around early October; for the May commencement, forms must be filled out around early March. Further information can be found at the Indiana University Ceremonies website: www.indiana.edu/~ceremony/. Consult with the Departmental Graduate Office GY 127 for further information.

M.S. Thesis Presentation — Students are encouraged to present their final M.S. research results at a regional or national meeting (e.g., AGU, GSA, AAPG, etc.) A departmental defense with title, date, time and location announced to the department is not formally required but is strongly recommended.

example credit hour distribution for a Masters student

Geological Sciences classes:		Credit Hours
G406	Introduction to Geochemistry	3.0
G423	Methods in Applied Geophysics	4.0
G524	Carbonate Facies and Environments	3.0
G554	Fundamentals of Plate Tectonics	3.0
G587	Organic Geochemistry	3.0
G601	Clay Mineralogy	3.0
G600	Advanced Techniques	1.0
Geology Total		20.0
Other graduate classes:		
C503 Spectroscopic Methods for Structural Determination		3.0
Research Hours:		
G810	Research	7.0
Total		30.0

Master of Science 'Report Option' Overview

This degree option is not recommended for most students because it may limit future educational and professional goals. An exception is students who plan to continue in the Ph.D. program in our Department building directly on research begun in the M.S. program. In such circumstances the report route can streamline that transition when appropriate but the formal decision to pursue this option should only be taken after admission to the Ph.D. The degree requirements include:

Total of 30 credit hours:

- 27 of the 30 hours must be graduate-level courses; the remaining 3 can be G810. 400-level courses from the Department of Geological Sciences that can be taken for graduate credit are listed in Appendix 8. 500- to 700-level Geology courses, and lower-level courses from other departments that count toward graduate credit can be found in the University Graduate School Academic Bulletin (see the section entitled Graduate Credit-General in the Academic Regulations section of the University Graduate School Academic Bulletin).
- 20 of the 27 hours must be from the Department of Geological Sciences.
- At least three 3-credit hour courses of 500 level or above must be taken from the Department of Geological Sciences.
- Selection of courses to be taken should be discussed with the primary advisor and research committee.

Research Skill or Foreign Language — Students must complete either a Research Skill in a designated area or a Foreign Language option. NOTE: neither of these options counts toward the 30 hour credit total required.

- Research Skill consists of 6 credit hours in 300/400-level courses (or higher) within a selected skill area. Appendix 6 contains a partial list of available skill areas and subjects within them.
- Foreign Language can be fulfilled by passing a proficiency examination in a foreign language (e.g., French, German, Russian or Spanish) administered by the University or by completing two 3-credit-hour 491-492-level courses in one of the approved languages with a grade of 'B' or higher. International students whose native tongue is not English can fulfill this requirement based on a test of English proficiency.

Transfer of credit — as above in MS overview.

Minimum Grade Point Average — as above in MS overview.

Report — the precise format and content of the report are determined in collaboration with the student's advisor and research committee. The report must be signed by the entire research committee. It is recommended that the report be in a format suitable for publishing, but it is not required.

Primary Advisor — an advisor (and co-advisor if necessary; as above in MS overview) should be selected no later than March 1st of the first year in the degree.

Research Committee – as above in MS overview.

Timeframe – as above in MS overview.

Application for Advanced Degree Form — as above in MS overview.

Commencement Ceremony — as above in MS overview.

M.S. Report Option Presentation — Students are encouraged to present their final M.S. research results at a regional or national meeting (e.g., AGU, GSA, AAPG, etc.) or as a departmental defense with title, date, time and location announced to the department.

MASTER OF SCIENCE DEGREE: GEOLOGICAL SCIENCE-ATMOSPHERIC SCIENCES

Admission Requirements

Undergraduate major in geological science, Atmospheric Science, mathematics, physics, chemistry, biology, or equivalent. Applicants not meeting this requirement may be expected to take additional work

Fields of Study — Atmospheric Sciences

Course Requirements

Requirements are the same as the M.S. degree (thesis or report option) with one additional requirement. At least 12 credit hours must be from a list of courses specific to Atmospheric Sciences defined by the Department of Geological Sciences.

courses that satisfy the 12 credit hour requirement:

G532 Physical Meteorology and Climatology
G531 Dynamic Meteorology
G533 Advanced Synoptic Meteorology and Climatology
G534 Air Pollution Meteorology
G555 Wind Power Meteorology
G562 Dynamic Meteorology: Boundary-Layer Meteorology
G570 Micrometeorology
G575 Climate Change Science

Doctor of Philosophy Degree Overview

The requirements below presume that the student begins the program having completed an MSc. Degree. The requirements are:

Total of 90 credit hours:

- 35 of the 90 hours must be graduate-level courses.
- 12 of these 35 hours must be graduate courses from the Department of Geological Sciences. In exceptional cases (e.g., when a student enters the Ph.D program with a strong background in the geological sciences and finds few courses in the department that will support their doctoral research program), a candidate may petition the Graduate Studies Committee in writing to waive this requirement.
- Transfer of credit up to 30 credit hours of graduate classes can be transferred from another institution, as long as a grade of 'B' or higher was earned. Pass/Fail or 'S' graded classes cannot be transferred. Courses to be transferred must be approved by the University Graduate School and must have been completed within the 7 calendar years prior to passing the Qualifying Exam.

Minimum Grade Point Average — All Ph.D students must maintain a 3.0 (B) grade point average.

Research Skill or Foreign Language — Students must complete either a Research Skill in a designated area or a Foreign Language option.

- Research Skill consists of 6 credit hours in 300, 400, or higher-level courses within a selected skill area. Appendix 6 contains a partial list of available skill areas and subjects within them. Courses taken to fulfill research skill requirements may be counted for graduate credit provided such courses are listed in the Graduate School Academic Bulletin as carrying graduate credit and they are approved by the Graduate Committee. The Graduate Committee will look favorably on courses that are at the graduate level in order to count the credits toward the 90-credit total. Each course must be passed with a grade of B or higher to satisfy the proficiency requirement.
- The Foreign Language option can be fulfilled by passing a proficiency examination (administered by the University) or by completing two 3-credit hour 491-492 -level courses in one of the approved languages with a grade of 'B' or higher. International students whose native tongue is not English can fulfill this requirement based on a test of English proficiency. Note: This option does not count toward the 35-hour credit total required.

G901 Advanced Research — Dissertation credits as G901 can be taken when the student has fulfilled all the course requirements detailed above, and completed 90 credit hours. A maximum of 6 semesters of G901 is permitted. G901 is currently 6 credit hours per spring and fall semester. Summer enrollment is not required unless the student intends to receive the degree during summer, in which case the student should enroll in 1 credit of G810 is necessary.

Primary Advisor — an advisor (and co-advisor if necessary; see page 3) should be selected no later than December 1st of the first year of the degree.

Advisory Committee — The advisory committee shall approve the student's program of study and counsel the student until the passing of the Qualifying Exam. The advisory committee must include at least two members from the major area and one from the minor. The name of the primary advisor and two other members of the committee must be confirmed in a signed letter to the Graduate Secretary.

Research Committee — Following the qualifying exam, a research committee must be selected, consisting of the primary advisor and 3-4 other members. The research committee can include all of the members of the Advisory Committee, supplemented by other IU faculty or individuals from other institutions connected to the research. Three of the members of this committee must be graduate faculty in the Department. The composition of the research committee and signatures from each of the members must be provided on the annual review form; any change must be communicated to the Graduate Secretary immediately.

Selection of a Minor — Selection of a Minor is also a requirement of the degree. The minor can be an area within the geosciences distinct from the chosen major (e.g., geophysics, geobiology, tectonics, geochemistry, geomorphology, mineralogy, sedimentology, hydrogeology, etc.), or it may be an area from outside the department (e.g., Sustainable Energy, History and Philosophy of Science, Chemistry, Physics, Biology, SPEA, Mathematics, etc.). Selection of internal minors must be approved by the Graduate Committee and by the Graduate School Dean's office prior to completing the proposed course work. Minors typically take between 6 and 12 credit hours to complete, but actual requirements and courses to be taken will be determined by the Minor Advisor who must be selected by the student from within the department in which the minor will be taken. The minor advisor typically becomes a member of the student's research committee (see below).

PRELIMINARY EXAMINATION

Objectives

The primary purpose of the Ph.D preliminary exam is to provide a departmental assessment of each student's level of preparation to complete the Ph.D degree in the early stage. The aim is to (i) ensure that students are actively developing a viable research project, and (ii) identify aspects of students' academic background that need strengthening early in their course of study.

Administration and Timetable

The Graduate Studies Committee administers the exam. Students who have already completed an M.S. degree are required to take the exam during their first year in the Ph.D program. Students entering the Ph.D program with an undergraduate degree are expected to take the exam during their second year of graduate study. The exam procedure begins late in November and concludes early in the spring semester.

Step 1: Study Plan — Toward the end of the fall semester students are required to complete a preliminary Ph.D research and study plan comprised of three parts:

Research Statement. A brief (less than one page) summary of a student's research plan. The format should be comparable to the "Intellectual Merit" section of the project summary for a standard proposal to the National Science Foundation written for a non-specialist in the research area.

Personal Statement. An assessment by the student of their perception of individual strengths and weaknesses pertinent to their research goals. This should address three areas: (i) academic background (e.g. coursework and field experiences), (ii) research skills (e.g. talents in writing, mathematics, computing, laboratory work, etc.), and (iii) personality characteristics important to professional success (e.g. tenacity, flexibility, commitment, ability to work in a team, etc.). Students should view this task as an opportunity for objective professional self-assessment that can help the committee identify appropriate topics for discussion during the oral exam. An honest assessment will be most beneficial in this regard because it will facilitate recognition of areas of academic background that need strengthening and thereby aid ultimate success.

Intellectual Development. A bulleted list of specific targets in academic preparation and research skills that require strengthening in order to complete your Ph.D.

Step 2: Feedback: Review of Study Plan — The graduate committee and the student's advisor will provide written feedback to the student two weeks after the deadline for submission of the study plan. This response will be in the form of a review that the student should use as a guide in preparation for the oral exam. It will focus on topics that will constitute the principal points for discussion in the oral exam, especially areas that students identify as strengths, rather than weaknesses.

Step 3: Oral Exam — The Graduate Studies Committee will schedule an oral exam for individual students In January with each student's advisor participating as an observer. Question topics will focus on areas of knowledge described in the individual review guide given to each student and centered on their strengths. Students should recognize, however, that the broad objective of the exam is to identify areas that need strengthening; hence, the committee may ask questions regarding any aspect of geosciences.

Step 4: Results of Exam — There are three possible outcomes of this exam:

Unconditional Pass. This pass recognizes that a student has a background without deficiencies, a viable research plan, and is suitably prepared for success in the Ph.D program.

Deferred Decision. When the student's self evaluation or the exam reveals a need to augment their academic background there may be a requirement to complete one or more courses, or fulfill other specific conditions, as determined by the committee and advisor. The result of the exam may be deferred pending the student's fulfillment of the conditions imposed by the committee.

Fail. A student can fail this exam. The primary reason for failure will be a student's inability to convince the committee that he/she can successfully complete the Ph.D program. For example: (i) an inability to provide coherent answers during the oral exam; (ii) the absence of a viable research plan; (iii) evidence of a lack of commitment to the profession or to the Ph.D. program. There is no possibility for retaking the exam for students who fail.

Qualifying Examination — This is a three-stage process and can be undertaken only after minimum course requirements have been fulfilled. It should be taken no later than the 6th semester after passing the Preliminary Exam:

1. The candidate will prepare a research proposal of approximately 15 pages excluding figures and references. This will be reviewed by the student's advisory committee and used as part of the exam assessment. The proposal must demonstrate that the proposed research consists of a suitable topic in terms of feasibility and importance. Preliminary results and familiarity with the field and literature are necessary before writing the proposal. Once revisions are made and the proposal is accepted by the advisory committee, the second stage can be initiated.

2. A written examination based on the research proposal is prepared by the advisory committee. This is a closed-book examination taken on a day chosen by the student, spanning approximately 3 hours in the morning and 3 hours in the afternoon. The examination is meant to evaluate familiarity with the chosen research area, to assess the relation of this field of research to others in the geosciences, and to alert the student to potential weaknesses in the research proposal. The advisory committee will evaluate responses to the examination. If responses are deemed sufficient, the third part of the process occurs. Students who fail the examination will be asked to leave the graduate program at the end of the semester, retake the examination, or take remedial classes within 6 months of the examination date.

3. Within 2 weeks after the written exam, the oral portion of the exam takes place. The format normally consists of an oral presentation of the research proposal to the advisory committee, and responses to committee members' questions regarding both the proposal and the examination answers. This examination takes approximately 3 hours. A room within the department must be booked for this purpose and presentation equipment reserved (see the staff person in room 129). Possible outcomes of this exam are: pass (admission to formal Ph.D. Candidate status), fail with permission to retake the exam, fail without permission to retake the exam, or a conditional pass (the candidate may need to satisfy some requirements set by the committee, which may involve further classes or research).

The Nomination to Candidacy form must be completed by the Graduate Secretary prior to the Qualifying Examination. If a candidate passes, all committee members must sign the form on the day of the Qualifying Examination. This form is then sent to the University Graduate School for acceptance of the examinee to become a formal Ph.D candidate. After approval of the Graduate School, the candidate must complete the form for nomination of research committee, which is on the University Graduate School's website (http://www.indiana.edu/~grdschl/).

Completion of Written Dissertation — The dissertation should be prepared in a form that is essentially ready to submit for publication in appropriate journals. Publication of results is strongly encouraged. The format of the dissertation must conform to the University's official policy on the production of theses (Appendix 4). Recently completed Ph.D dissertations in the Department library are good examples to follow.

Dissertation Defense — The defense should timed to ensure that at least eight months will elapse between passing the Qualifying Examination and the date the degree is awarded. The Research Committee and student must come to an agreement that the dissertation is at a stage that is suitable for defense, based on drafts of the dissertation submitted to the committee. An Announcement of Defense must be submitted to the University Graduate School a minimum of 30 days prior to the defense date. An example of the format required is included in Appendix 4. Two weeks prior to the defense a copy of the dissertation must be placed in the front office of the department for public perusal. The defense itself consists of a public presentation of the dissertation research that any interested faculty and students may attend, followed by an open session of questions and discussion, after which the student's Research Committee conducts a rigorous closed-session, oral examination of the student.

The result of the defense is determined as a pass, conditional pass, a deferred decision, or a failure without the option to retake. The conditional pass usually requires revisions of the dissertation as recommended by the research committee, and a deferred decision indicates that the opinion of the research committee was not unanimous, a circumstance that requires reports from the research committee detailing the differing opinions to the Dean of the Graduate School.

On the day of a successful defense the Graduate Secretary needs to receive (i) A Removal of Incomplete form, (ii) two copies of the dissertation abstract, one unsigned and one signed in designated spaces by the research committee (including the minor advisor), (iii) sufficient copies or the original dissertation and each bound copy of the acceptance pages of the dissertation printed on 100% cotton paper signed by the research committee (including the minor advisor). Students should plan to submit the final version of their dissertation electronically to the University Graduate School as soon as possible.

Timeframe — The Ph.D dissertation must be accepted by the student's research committee and a copy must be submitted to the University Graduate School within seven years of passing the Qualifying Examination. Failure to do so will result in termination of Ph.D candidacy. Reinstatement of candidacy is possible and involves obtaining permission of the department chairperson, fulfilling any reinstatement requirements from the Department, passing the Qualifying Examination again, and then requesting reinstatement from the Dean. Once reinstated, the degree must be completed within three years.

Application for Advanced Degree — This form must be filled out a minimum of 60 days prior to the desired graduation date, regardless of whether the student attends the commencement ceremony or not. This form is obtained from the Departmental Graduate Office. Paperwork must be filled out in advance to attend the commencement ceremony. To attend the December commencement, forms must be filled out in early October; for the May commencement, forms must be completed in early March. Further information can be found at the Indiana University Ceremonies website www.indiana.edu/~ceremony/. Further information can be obtained from the Graduate Secretary in Geology 127.

example credit hour distribution for a Ph.D. student

Classes:		Credit Hours
G513	Seismology	3.0
G583	Isotopic Systematics	3.0
G514	Geophysical Signal Analysis	3.0
G612	Inverse Methods in Geophysics	3.0
G572	Basin Analysis and Hydrocarbons	3.0
G601	Clay Mineralogy	3.0
G571	Principles of Petroleum Geology	3.0
G451	Hydrogeology	3.0
G554	Fundamentals of Plate Tectonics	3.0
G589	Geomicrobiology	3.0
Total		30.0
Minor:		
A597	Introduction to Programming I	3.0
A598	Introduction to Programming II	3.0
P573	Scientific Computing	3.0
P673	Advanced Scientific Computing	3.0
Total		12.0
Total all Graduate Courses:		42.0
Research Skill (inclusion into 90 credits requires approval of Graduate Committee):		
E538	Statistics for Environmental Science	3.0
K310	Statistical Techniques	3.0
Total		6.0
Research Hours:		
G810	Research Hours	42.0
Total		90.0

DOCTOR OF PHILOSOPHY DEGREE: GEOLOGICAL SCIENCE-ATMOSPHERIC SCIENCES

Course Requirements

Requirements are the same as the regular Ph.D degree with one additional requirement. At least 12 credit hours must from a list of courses specific to Atmospheric Sciences defined by the Department of Geological Sciences.

courses that satisfy the 12 credit hour requirement:

G532 Physical Meteorology and Climatology
G531 Dynamic Meteorology
G533 Advanced Synoptic Meteorology and Climatology
G534 Air Pollution Meteorology
G555 Wind Power Meteorology
G562 Dynamic Meteorology: Boundary-Layer Meteorology
G570 Micrometeorology
G575 Climate Change Science

Doctor of Philosophy Degree without Prior M.Sc. Degree in Geological Sciences

The requirements below presume that the student begins the program having completed a Bachelors degree. The requirements include:

Total of 90 credit hours:

- 35 of the 90 hours must be graduate-level courses.
- 25 of these 35 hours must be graduate courses from the Department of Geological Sciences
- Transfer of credit - as specified for Ph.D.

The following items have the same requirements as those specified in the Ph.D. Overview:

- A 3.0 (B) grade point average
- Research Skill or Foreign Language
- G901 Advanced Research
- Primary Advisor
- Research Committee
- Selection of a Minor
- Preliminary Examination - students are expected to take the examination either in their first or third semester of enrollment in the degree program.
- Qualifying Examination
- Completion of Written Dissertation
- Dissertation Defense
- Timeframe
- Application for Advanced Degree

Appendices

INDIANA UNIVERSITY

IU GEOLOGICAL SCIENCES

GRADUATE HANDBOOK APPENDICES 2013-2014

Table of Contents

Appendix 1

Faculty Directory 2013-2014

Appendix 1: Faculty, Emeritus and Adjunct Faculty

Teaching Faculty: (The following people can supervise PhD/Masters students and serve on research committees)						
Title	Name	Specialty	Phone	Room	Email	Department
Professor	Rebecca Barthelmie	Atmospheric Science and Sustainability	6-5135	MSBII 302	rbarthel	Geol Sci
Professor	Abhijit Basu	Sedimentary and Planetary Petrology	5-6654	G521	basu	Geol Sci
Professor	David Bish	Clay Mineralogy; X-ray Diffraction	5-2039	G209	bish	Geol Sci
Professor	Simon Brassell	Biogeochemistry, Organic Geochemistry	5-3786	MSBII 403	simon	Geol Sci
Professor	James Brophy	Igneous Petrology, Geochemistry	5-6417	G309	brophy	Geol Sci
Professor	Jeremy Dunning	Structural Geology	5-4448	G121	dunning	Geol Sci
Asst. Professor	Douglas Edmonds	Sedimentary Geology	5-4512	G425	edmondsd	Geol Sci
Asst. Professor	Julie Fosdick	Sedimentary Geology	TBD	G405	jfosdick	Geol Sci
Professor	Michael Hamburger	Geophysics, Seismology and Tectonics	5-2934	G415	hamburg	Geol Sci
Assoc. Professor	Claudia Johnson	Geobiology	5-0646	G501	claudia	Geol Sci
Professor	Kaj Johnson	Geophysics	5-3612	G401	kajjohns	Geol Sci
Asst. Professor	Jackson Njau	Geoanthropology	6-3170	G513	jknjau	Geol Sci
Assoc. Professor	Greg Olyphant	Hydrogeology, Quaternary Geology and Geomorphology	5-1351	G429	olyphant	Geol Sci
Professor	Gary Pavlis	Geophysics, Seismology and Tectonics	5-5141	G409	pavlis	Geol Sci
Assoc. Professor	David Polly	Geobiology	5-7994	G524a	pdpolly	Geol Sci
Professor	Lisa Pratt	Biogeochemistry, Sedimentology/ Stratigraphy	5-9203	MSBII 416	prattl	Geol Sci
Professor	Sara C. Pryor	Atmospheric Science	5-5155	MSBII 301	spryor	Geol Sci
Professor	Ed Ripley	Isotope Geochemistry	5-1196	G329	ripley	Geol Sci
Professor	Juergen Schieber	Sedimentary Geology	5-5322	G523	jschiebe	Geol Sci
Asst. Professor	Laura Wasylenki	Geochemistry of Metals	5-7508	MSBII 420	lauraw	Geol Sci
Professor	Robert Wintsch	Metamorphic, Structural, Sedimentary Petrology, Tectonics and Geochronology	5-4018	G325	wintsch	Geol Sci
Assoc. Professor	Chen Zhu	Hydrogeology, Mass Transport, Water-Rock-Gas-Microbe Interactions	6-1884	MSBII 424	czhu	Geol Sci
Research Faculty: (The following people can serve on research committees, and the Senior Scientists can supervise PhD/Masters students)						
Senior Lecturer	Bruce Douglas	Tectonics and Structural Geology	5-3848	G423	douglasb	Geol Sci
Research Scientist	Erika Elswick	Geochemistry, Sedimentology, Sedimentary Ore Deposits	5-2493	MSBII 428	eelswick	Geol Sci
Senior Scientist	Chusi Li	Petrology, Geochemistry, Mineral Deposits	5-1558	G217	cli	Geol Sci
Research Scientist	Peter Sauer	Biogeochemistry, Paleoclimatology	5-6591	MSBII 410	pesauer	Geol Sci
Senior Scientist	Arndt Schimmelmann	Organic Geochemistry, Chemical Oceanography	5-7645	G321	aschimme	Geol Sci

Appendix 1: Faculty, Emeritus and Adjunct Faculty

Emeritus Faculty						
	Robert Blakely	Geophysics			blakely	Geol Sci
	J. Robert Dodd	Geobiology	5-4957	G525	dodd	Geol Sci
	David L. Dilcher	Geobiology	6-0618	S209	dilcher	Geol Sci
	Donald Hattin	Stratigraphy	5-8232	G519	hattin	Geol Sci
	Erle Kauffman	Paleontology	5-5154	G517	kauffman	Geol Sci
	Enrique Merino	Geochemistry and Petrology	5-5088	G527	merino	Geol Sci
	Haydn H. Murray	Clay Mineralogy	5-5583	G117	murrayh	Geol Sci
	Al Rudman	Geophysics	5-8232	G519	rudman	Geol Sci
	Lee J. Suttner	Sedimentology and Stratigraphy	5-4957	G525	suttner	Geol Sci
Adjunct Faculty: (The following people can supervise a Ph.D./Masters student, but require a co-advisor from the Faculty or Research Faculty. They can also serve on research committees)						
Professor	Henk Haitjema	Hydrology	5-0731	SPEA	haitjema	SPEA
Senior Scientist	Brian Keith	Sedimentology, Stratigraphy	5-4213	S117	keithb	IGS
Distinguished Professor	Peter Ortoleva	Geochemistry	5-2717	CH203E	ortoleva	Chemistry
Professor	Jeff White	Geochemistry	5-0731	MSBII 410	whitej	SPEA
Research Scientist	Maria Mastalerz	Coal Petrology, Coal Geochemistry, Coalbed Gas	5-9416	S225	mmastale	IGS
Director and State Geologist	John Steinmetz	Paleontology	5-5067	S107	jsteinm	IGS
Research Affiliate	Carl Rexroad	Paleontology	5-7428	S319	crexroad	IGS
Research Scientist	Michael Prentice	Glacial and Geomorphology	6-3117	S318	mlprenti	IGS
Research Scientist	Sally Letsinger	Hydrogeology, GIS	5-1356	S301D	sletsing	IGS
Assist. Professor	Adam Maltese	Science Education/Adjunct Faculty Geological Sciences	6-8059	Wright Ed Bldg 3054	amaltese	School of Education
Professor	Chris Craft	Public and Environmental Affairs	5-5971	SPEA 410J	ccraft	SPEA

[1] Only the listed phone number is needed when calling from on-campus; add 85 to the front to reach them from off-campus locations.

[2] Add @indiana.edu to each of these emails to contact the person.

Please note that this list changes every year – please consult the updated directory information placed in student mailboxes at the beginning of the fall semester.

Appendix 2

Forms for the Masters Degree

Appendix 2: Forms for the M.S. Degree

NAME:_____

ANNUAL REVIEW OF M.S. DEGREE PROGRESS

Students are required to organize a brief meeting with their Advisory Committee at least once a year (before April 15) to ensure that they share a common understanding of course selections, and research activities, plans and goals.

To assist in this process, students should provide copies of the form, duly completed, to all committee members **at least 24 hours prior to this progress meeting**. After the meeting, a PDF of the completed and signed form should be submitted to the OnCourse Graduate Student website. Information on this form and in the summary statement of research progress will be used by the CGS to help rank students for academic awards and financial support.

COURSEWORK CHECKLIST

Graduate requirements:	Completed ?	Comments
1. ≥ 9 credit hours ≥ 500 level	☐	_____
2. ≥ 12 of the 22 hours of graduate course credits in Geological Sciences	☐	_____
3. ≤ 8 credit hours graduate transfer credit	☐	_____
4. ≥ 30 credit hours total graduate credit	☐	_____

Annual course load is 30 credit hours: 12 in Fall & Spring Semesters, 6 in Summer Session

RESEARCH PLANS

Program Options:

M.S. students must complete:

☐ Either a thesis (strongly recommended),

☐ Or a research report plus the research skill ☐ Or the foreign language requirement

Provisional Thesis (or Report) Title:

Brief Outline (max, 1 page) of Research Objective & Strategies:

Aims, field work, sampling, analytical methods, etc.

Summary of Immediate (3-6 months) Research Plans:

Future activities, especially during the summer months

Appendix 2: Forms for the M.S. Degree

PROPOSED LONG-TERM RESEARCH PLANS AND TIMETABLE:

Anticipated phases of research activities and contingencies

Timetable and Dates:

1. Annual Review: Date, time, and venue

2. Thesis Completion: Target dates for draft and final version. Provisional date for thesis defense.

Summary of Financial Support:

Indicate sources of support, e.g. Al (provide course #), RA (note funding agency & PI), Fellowship (give source, self, other grants (e.g. GSA, Sigma XI, etc.)

	Semester 1	Semester II	Summer
Year 1			
Year 2			

RESEARCH PROGRESS

Summary of Progress

A summary statement, preferably a one-page synopsis, which documents the following items, should be appended to this form. Several of these details would typically be compiled for inclusion in a full curriculum vitae, which may also be appended to this report.

1. **Research Activities:** Summarize achievement during the past year in field work, in laboratory analyses, in data collection, and written reports.

2. **Proposals and Contributions to Proposals:** Document grant applications submitted for research or fellowship support, including title, funding agency, date of submission, duration, purpose, and amount of funding sought/awarded, and the current status (whether pending, accepted, or declined). A copy of the proposal should be provided. Comparable information should also be given for grant applications submitted by others, for example an advisor or collaborator, to which you contributed. In such cases a cop of the proposal summary should be provided.

3. **Conferences and Short Courses:** Give details of meetings, short course or workshops attended, including their title(s), sponsoring organizations (e.g. GSA, AAPG), dates, location, and the source of any financial support enabling attendance.

4. **Presentations:** Provide a summary of any contributions to oral presentations or posters with information on the title, authorship, venue, date, and speaker (if applicable). Include a copy of the abstract, if available.

5. **Publications:** List all abstracts and papers, giving title, authorship, journal or book (e.g. conference proceedings or symposia), volume, pagination, and date of publication. Separately list comparable information for other manuscripts in preparation, submitted, under revision, accepted, or in press. Denote whether publications are peer-reviewed and provide copies of abstracts

6. **Other Academic or Career Activities:** Comment on any other relevant activities (e.g. internships) and on any awards received.

Appendix 2: Forms for the M.S. Degree

COMMITTEE REVIEW AND REMARKS

Coursework Status

Based on details documented in Coursework Summary.

1. Required Course. As determined by Advisory Committee:

2. General Requirements. Enter accumulated credit hours within each category.

≥ 500 level Geol. Sci. (≥ 9h)	☐	Total Geol Sci. (≥ 20 h)	☐
Transferred grad. Credit (≤8 h)	☐	Total graduate credit (≥ 30 h)	☐

3. Options. Specify credit hours accumulated within chosen option.

Option A:	Research (≤8 h)	☐			
Option B:	Research (≥ 3 h)	☐	plus	Research skill (≥6 h)	☐
Option C:	Research (≥ 3 h)	☐	plus	Foreign Language (≥ 6 h)	☐

COMMITTEE COMMENTS

1. Assessment of Degree Progress. Contents based on coursework & research activities:

2. Recommendations. Specific suggestions or requirements regarding degree progress.

Approval. Signatures designate agreement on course selection and research programs.

	Signature	Date
Research Advisor	_____	_____
Advisory Committee member:	_____	_____
Advisory Committee member:	_____	_____
Student:	_____	_____

All pages of this form must be duly completed, signed, and submitted as one .pdf file to the Grad Student Site folder on Oncourse by April 15th.

APPLICATION FOR ADVANCED DEGREE UNIVERSITY GRADUATE SCHOOL

Month in which you wish degree to be conferred _____

Please note that if this date changes you must notify the Recorder for your name to appear in the Commencement program _____(please initial here).

Diplomas are mailed by the Office of the Registrar approximately three months after the degree is conferred.

CAMPUS ID NUMBER: _____ DATE OF BIRTH: _____

NAME _____

_____	_____
Current Address	Permanent Address
_____	_____
Street	Street
_____	_____
(City, State) (Zip)	(City, State) (Zip)

Local Telephone number ( )_____ Email Address _____

Did you ever attend a regional campus for graduate credit? Yes_____ No____

If yes, where and when _____

Will you be transferring credit from another institution for this degree? Yes_____ No____

If yes, from where and how many credit hours _____

Have you ever been a Continuing Non-degree Student? Yes_____ No____

Will you be continuing work for the Ph.D. at IU? Yes_____ No____

Check appropriate boxes

Master of Arts Department/Program _____Major_____

( ) with thesis

( ) with research skill (specify courses) _____

( ) with language (specify language and how fulfilled) _____

( ) with essay, internship, or project

( ) with exam (date completed) _____

Master of Science Department/Program_____ Major_____

( ) with thesis

( ) with research skill (specify courses) _____

( ) with language (specify language and how fulfilled) _____

( ) with essay, internship, or project

( ) with exam (date completed) _____

Master of Fine Arts Department/Program_____ Major_____

( ) date of thesis show _____

( ) with thesis

Master of Arts for Teachers* Department/Program_____Major_____

* Copy of Public Instruction Teacher's License must be subject to the Master's Recorder, Kirkwood Hall 111

Diploma will be sent to address on official University records.
Please check your address at the Office of the Registrar, Franklin Hall 100.

Appendix 3

Forms for the Ph.D. Degree

Appendix 3: Forms for the Ph.D Degree

NAME:_____

ANNUAL REVIEW OF Ph.D DEGREE PROGRESS

Students are required to organize a brief meeting with their Advisory Committee at least once a year (by April 15) to ensure that they share a common understanding of course selections, and research activities, plans, and goals.

To assist this process, students should provide copies of the form, duly completed, to all committee members **at least 24 hours prior to this progress meeting.** After the meeting, a PDF of the completed and signed form should be submitted to the OnCourse Grad Student website.

Information on this form and in the summary statement of research progress will be used by the CGS to help ranks students for academic awards and financial support.

COURSEWORK CHECKLIST

Graduate Requirements:	Completed?
1. ≥ 12 credit hours formal graduate credits in Geological Sciences	☐
2. ≥35 credit hours total formal graduate coursework	☐
3. ≤30 credits of transferred graduate credit	☐
4. ≥90 credit hours total graduate credit	☐
5. Specified credit hours in minor (determined by minor advisor)	☐
6. ≥6 credit hours foreign language or research skill	☐

Annual course load is 30 credit hours: 12 in Fall and Spring Semesters, 6 in Summer Session

RESEARCH PLANS

Provisional Thesis (or report) Title:

Brief Outline of Research Objectives and Strategies:

Aims, field work, sampling, analytical methods, etc.

Summary of Immediate (3-6 months) Research Plans:

Future activities, especially during the summer months

Proposed Long-term Research Plans and Timetable:

Anticipated phases of research activities and contingencies

Appendix 3: Forms for the Ph.D. Degree

Timetable and Dates:

1. Annual Review: Date, time, and venue

2. Qualifying Examination. Proposed date and time

3. Thesis Completion: Target dates for draft and final version. Provisional date for thesis defense.

Summary of Financial Support:

Indicate sources of support, e.g. Al (provide course #), RA (note funding agency & PI), Fellowship (give source, self, other grants (e.g. GSA, Sigma XI, etc.)

	Semester 1	Semester II	Summer
Year 1			
Year 2			
Year 3			
Year 4			

RESEARCH PROGRESS

Summary of Progress

A summary statement, preferably a o ne-page synopsis, which documents the following items, should be appended to this form. Several of these details would typically be compiled for inclusion in a full curriculum vitae.

1. **Research Activities:** Summarize achievement during the past year in field work, in laboratory analyses, in data collection, and written reports.
2. **Proposals and Contributions to Proposals:** Document grant applications submitted for research or fellowship support, including title, funding agency, date of submission, duration, purpose, and amount of funding sought/awarded, and the current status (whether pending, accepted, or declined). A copy of the proposal should be provided. Comparable information should also be given for grant applications submitted by others, for example an advisor or collaborator, to which you contributed. In such cases a copy of the proposal summary should be provided.
3. **Conferences and Short Courses:** Give details of meetings, short course or workshops attended, including their title(s), sponsoring organizations (e.g. GSA, AAPG), dates, location, and the source of any financial support enabling attendance.
4. **Presentations:** Provide a summary of any contributions to oral presentations or posters with information on the title, authorship, venue, date, and speaker (if applicable). Include a copy of the abstract, if available.
5. **Publications:** List all abstracts and papers, giving title, authorship, journal or book (e.g. conference proceedings or symposia), volume, pagination, and date of publication. Separately list comparable information for other manuscripts in preparation, submitted, under revision, accepted, or in press. Denote whether publications are peer-reviewed and provide copies of abstracts
6. **Other Academic or Career Activities:** Comment on any other relevant activities (e.g. internships) and on any awards received.

Appendix 3: Forms for the Ph.D Degree

COMMITTEE REVIEW AND REMARKS

Coursework Status

Based on details documented in Coursework Summary

1. Required Courses. As determined by Advisory Committee

2. General Requirements. Enter accumulated credit hours within each category.

Total Geol. Sci. (≥ 12 h)	☐	Language/Research Skill (≥ 6 h)	☐
Minor	☐	Graduate Course Credit (≥ 35 h)	☐
Transferred Grad Credit (≤ 30 h)	☐	Research	☐
Total Graduate Credit (≥ 90 h)	☐		

Committee Comments

1. Assessment of Degree Progress. Comments based on coursework and research activities.

2. Recommendations. Specific suggestions or requirements regarding degree program.

3. Approval. Signatures designate agreement on course selection and research progress.

	Signature	Date
Research Advisor:	_____	_____
Advisory Committee member:	_____	_____
Advisory Committee member:	_____	_____
Advisory Committee member:	_____	_____
Minor Advisor:	_____	_____
Student:	_____	_____

All pages of this form must be duly completed, signed, and submitted as one .pdf file to the Grad Student Site folder on Oncourse by April 15th.

Appendix 3: Forms for the Ph.D Degree

RESEARCH AND THE UNIVERSITY GRADUATE SCHOOL

NOMINATION OF RESEARCH COMMITTEE FOR THE PH.D

Name of Student_____ Campus I.D_____

Department_____ Birth Date_____

Major _____ Minor(s)_____

Date of Qualifying Examination _____

Date of Enrollment in University Graduate School _____

Proposed Dissertation Title _____

_____

_____

Dissertation Prospectus: Please attach a one-to-two page summary of the proposed research. If the research involves human subjects, animals, biohazards, biosafety, or radiation, please also attach an approval from the appropriate committee. Note: Your signature below indicates that you have read the attached prospectus and agree to serve, if appointed, on a committee to supervise this research.

NAME	SIGNATURE	DEPARTMENT (Please type)	EMAIL
_____	_____	_____	_____
		(Co-Chair of Committee)	
_____	_____	_____	_____
		(Co-Chair of Committee)	
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
		(Minor representative)	

ALL COMMITTEE MEMBERS MUST BE MEMBERS OF THE UNIVERSITY GRADUATE SCHOOL FACULTY AND AT LEAST HALF MUST BE FULL MEMBERS.

I certify that I have examined the attached prospectus and that this committee is appropriate to supervise research in this area.

Signature/Department Chairperson_____Date_____

**To be used only by students who have passed the qualifying examinations and who have previously been admitted to candidacy.*

Announcing the Final Examination of

_____

For the
Degree of Doctor of Philosophy in Geological Sciences
Thursday, December 7th, 2012, 1:00 p.m.
Room GY338, Geology Building

Dissertation: Open System Magmatism, and the emplacement of the Partridge River Intrusion, Duluth Complex, Minnesota.

The Partridge River Intrusion (PRI) is one of several large, tholeiitic bodies that occur along the Western portion of the Duluth Complex in northern Minnesota. Mafic magmatism developed in response to intercontinental rifting at approximately 1.1 Ga. The intrusion is host to several Cu-Ni sulfide deposits that are found near the basal contact with metapelitic footwall (the Proterozoic Virginia Formation). The upper portion of the PRI is characterized by thick, unlayered, monotonous sequences of troctolite and augite troctolite. Thin (usually less than 5 meters in thickness) layers of melatroctolite and picrite occur at irregular intervals. Cu-Ni mineralization, and iron-rich units of ferrogabbro occur near the base of intrusion. The ferrogabbro units are also enriched in incompatible elements (P, Y, Ti), and are intercalated with troctolite.

Previous researchers have suggested genetic mechanisms to explain the chemical variations in the PRI that range from differentiation of a single magmatic pulse, to multiple inputs of chemically distinct magma. This study was conducted to evaluate and model the magmatic process involved during the emplacement of the PRI. Samples were selected from a drillcore located to the northwest of the major Cu-Ni sulfide body at the Babbitt deposit. The site was chosen to avoid discontinuities caused by the presence of metapelitic xenoliths of the Virginia Formation, which are common in the vicinity of the mineralization.

Ferrogabbro at the bottom of the intrusion was derived from an evolved melt of ferrodioritic composition, emplaced early in the history of the PRI. A later, more primitive troctolitic melt intruded the ferrogabbro. The main massive Cu-Ni mineralization is distinct, isotopically and compositionally, from the overlying disseminated mineralization, and was emplaced as a separate body, also early in the history of the PRI. Both the differentiated, ferrogabbroic melt and the sulfide melt which formed the massive mineralization evolved in one or more staging chambers in the shallow crust.

Outline of Studies
Major: Geology
Minor: Geochemistry

Educational Career
BS, Indiana University, 1983
MS, Indiana University, 1989

Committee in Charge
Professor Edward Ripley, Chair, Geological Sciences (855-1196)
Dr. Haydn Murray
Dr. Lisa Pratt
Dr. Robert Wintsch
Dr. James Brophy

Approved: _____
Edward Ripley, Chair

(Any member of the Graduate Faculty may attend. As a courtesy, please notify the Committee Chair in advance).

Appendix 4

A Guide to the Preparation of Theses and Dissertations

The University Graduate School has a comprehensive website informing students on the requirements for preparing theses and dissertations. Please review materials provided for completion of the research degree at: www.graduate.indiana.edu/preparing-theses-and-dissertations.php

Appendix 5

Example of a Masters Thesis - Printing and Binding

Appendix 5: Guidelines for MS Thesis

Format:

- Typed, double-spaced.
- Ink-jet or laser printers only.
- No officially required font and size (check with Mary and your advisor for suggestions).
- 1-1/2" left margin and 1" right, top, and bottom margins for all text pages, figures, tables, plates, maps, appendices, etc.
- Required material in front of thesis (known as front matter in graduate handbook) includes, as follows:

  Title

  Acceptance and Signature page

  Acknowledgments

  Abstract

  Table of Contents

  Lists of tables, figures, and appendices
- There are no required sections for the body of the thesis (check with your advisor for suggestions).
- Each page must be numbered consecutively, except the title and vita pages. These pages do not have numbers. Use lower-case Roman numbers on the front matter (e.g., Acceptance - ii, Acknowledgments – iii). Use Arabic numbers on the body of the thesis, starting on the introduction page or first chapter and ending on the last page before the vita page. The last page could be the conclusions or appendix.
- Photographs
- Paper required for bound thesis is 20 or 24 lb. weight, watermarked, 100% cotton rag bond, and standard size (8-1/2" x 11"). IU bond cannot be used.
- Binding: Four bound copies are required (2 for the graduate school, 1 for the department, and 1 for your advisor).
- It is suggested to have your thesis bound at the following IU accepted binderies:

  The Smith Bookbindery (call for quotes)

  112 West Tenth Street, Bloomington, IN 47404 (812) 332-2743

  or

  National Library Bindery Company of Indiana (call for quotes)

  55 South State Avenue, Suite 100, Indianapolis IN 46201 (317) 636-5606

  21-day regular turnaround; 7-day rush
- Check with other committee members if other binding methods are acceptable for their copies, if you plan to give your thesis to all committee members. The other suggested binding method is Velo binding, not spiral. It is available at Kinko's for $3.45 a copy.
- Other: CV needs to include birth date and birth place
- Printing, copying, etc.

Appendix 6

Research Skill Courses

Appendix 6: research skill subjects

Research Skill Subjects (updated 2008) (Note: This is not an exhaustive list, other subjects may be taken with permission of the Graduate Committee)		
Mathematics		
Applied Mathematics		Cr hr
M301	Linear Algebra and Applications	3.0
M303	Linear Algebra for Undergraduates	3.0
M311	Calculus III	3.0-5.0
M312	Calculus IV	3.0
M343	Introduction to Differential Equations w. Applications I	3.0
M344	Introduction to Differential Equations w. Applications II	3.0
M415	Elementary Complex Variables w. Applications	3.0
M441	Introduction to Partial Differential Equations w. Applications I	3.0
M442	Introduction to Partial Differential Equations w. Applications II	3.0
Statistics and Probability		Cr hr
K310	Statistical Techniques	3.0
M360	Elements of Probability	3.0
M365	Introduction to Probability and statistics	3.0
M366	Elements of Statistical Inference	3.0
M463	Introduction to Probability Theory I	3.0
M464	Introduction to Probability Theory II	3.0
M466	Introduction to Mathematical Statistics	3.0
M467	Advanced Statistical Techniques I	3.0
M468	Advanced Statistical Techniques II	3.0
E538	Statistics for Environmental Science	3.0

Appendix 6: research skill subjects

Computer Science		
A304	Introductory C++ Programming	2.0
A306	Object oriented programming in C++	2.0
A346	User Interface Programming	3.0
C201	Introduction to Computer Science	4.0
C202	Introduction to Software Systems	4.0
C311	Programming Languages	4.0
C335	Computer Structures	4.0
C343	Data Structures	4.0
M371	Elementary Computational Methods	3.0
M471	Numerical Analysis I	3.0
M472	Numerical Analysis II	3.0
Physics		
P302	Elementary Electronics	2.0
P421	Digital Electronics and Microprocessors	3.0
P422	Analog Electronics and Semiconductor devices	3.0
P431	Electronic Laboratory I	2.0
P432	Electronic Laboratory II	2.0
Chemistry		
C315	Chemical Measurements Laboratory I	3.0
C317	Equilibria and Electrochemistry	2.0
C318	Spectrochemistry and Separations	2.0
C364	Introduction to Basic Measurements	3.0
C501	Chemical Instrumentation	3.0
Geology		
G582	Computational Methods in Earth Sciences	3.0
G586	Geochemical Modeling	3.0

Appendix 7

Work Allowances for F-1 International Students

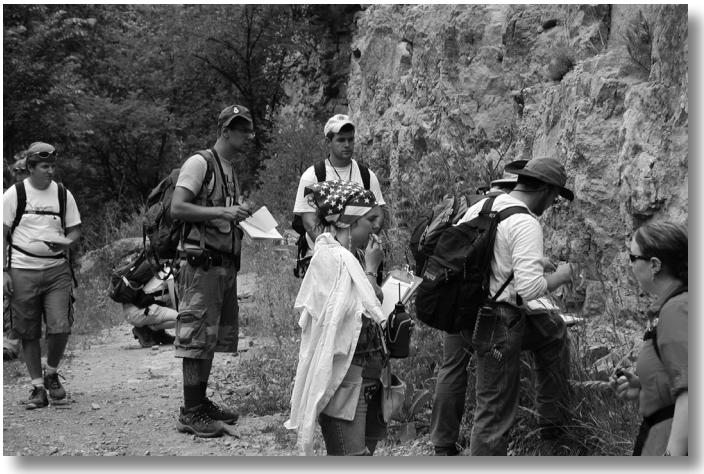
Appendix 7: Work Allowances for F-1 International Students

For the most current information, please refer to: www.indiana.edu/~intlserv/students/f-1/index.php

- During Fall and Spring Sessions, F-1 students cannot work more than **20** hours a week.
- During the Summer, Christmas, Thanksgiving and Spring Break periods on the University's official calendar, you can work 40 hours **on-campus only** per week, without needing further authorization.
- To work full or part-time off-campus, you need to use **Curricular Practical Training (CPT)**, which must be authorized by the International Office (Franklin Hall Rm 306). You must have been a full-time student on the campus for two semesters or nine months before you are eligible to apply for CPT. Any off-campus work you do must be related to your degree.
- To work more than 20 hours **during** Spring and Fall sessions, you must also get authorization for Curricular Practical Training.

NOTE: All F visa international students have 12 months of Curricular Practical Training and 12 months of Optional Practical Training (which is used to allow you to work after having graduated while still on the F visa). You can sacrifice the 12 months of OPT and have 24 months maximum of CPT. Note also that if you accidentally do more than 12 months of CPT, you will automatically lose your 12 months of OPT, regardless of whether you use all 24 months of CPT or not.

The International Office is obliged to monitor hours worked by International students and to report this information to the SEVIS system. If you have any questions about whether your work situation is within status, contact the International Office at 855-9086; intlserv@indiana.edu or visit their webpage: http://www.indiana.edu/~intlcent/



Appendix 8

400-Level Courses Applied Toward Graduate Credit

Appendix 8: 400-level courses for graduate credit

400 Level Courses that Count for Graduate Credit
within the Department of Geological Sciences

G-404, Geobiology

G-406, Introduction to Geochemistry

G-411, Invertebrate Paleontology

G-413, Introduction to Earth Physics

G-415, Geomorphology

G-416, Economic Geology

G-417, Optical Mineralogy

G-418, Igneous and Metamorphic Petrology

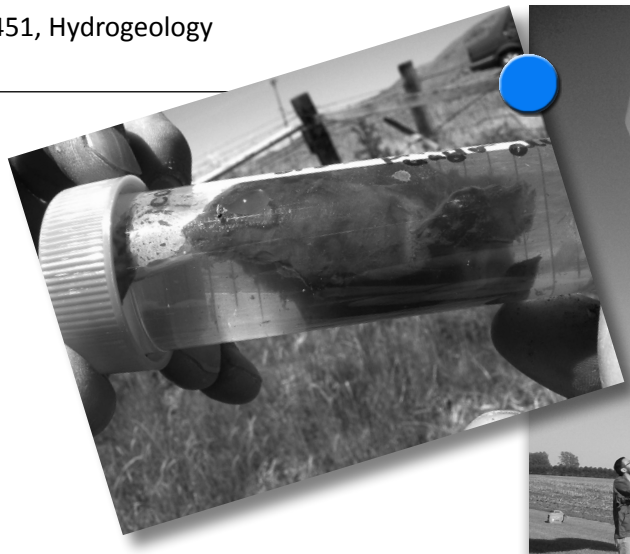
G-420, Regional Geology Field Trip

G-423, Methods in Applied Geophysics

G-427, Introduction to X-Ray Mineralogy

G-429, Field Geology in the Rocky Mountains

G-451, Hydrogeology



NOTES

INDIANA UNIVERSITY