

GRADUATE STUDENT HANDBOOK



Geoscience Master's Program

Edited by the Graduate Committee
August 2022



Department of Earth, Environmental & Atmospheric Sciences
Ogden College of Science and Engineering
Western Kentucky University

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WORDS OF WELCOME

Welcome to the M.S. Geoscience program in the Department of Earth, Environmental & Atmospheric Sciences at WKU. Our program is interdisciplinary in nature, bringing together research perspectives from across the human-physical spectrum. The Department's internationally recognized graduate faculty conduct research on a variety of human-environment interactions, ranging from planning, transport, and development issues to water resources, climate change, and natural resources. Graduate students may choose to focus their thesis research in one of five major areas of concentration: Physical, Cultural, Environmental, Climate, and Geographical Information Science. The Department offers a wide range of supporting funding, equipment, and facilities, including resources at the Kentucky Climate Center, Disaster Science Operations Center, Kentucky Mesonet, Center for Human GeoEnvironmental Studies, Crawford Hydrology Laboratory, and the Reynolds Geological Sciences Laboratory. Graduate Assistants and Graduate Research and/or Teaching Fellows work with designated faculty on research projects, teach introductory courses, and provide mentoring support for undergraduates. We aim to make your experience in the M.S. Geoscience program educational, rewarding, inspiring, fun, and productive.

PURPOSE OF THE GRADUATE HANDBOOK

The WKU Geoscience Graduate Handbook was developed by the Graduate Faculty and contains faculty/student policies and procedures for the Geoscience Graduate Program. The purpose of this handbook is to underscore expectations and provide clear guidelines and deadlines for graduate students, graduate advisors, and committees to follow in order to provide the highest quality outcomes and timeliest path toward successful completion of the graduate degree requirements. Each graduate student must read and adhere to the policies and procedures presented in this handbook. It is imperative that each student work closely with advisors and committees to comply with these guidelines, and to uphold the foundation of academic excellence at the graduate level. While degree programs may be flexible enough to accommodate certain unique situations, the Geoscience Graduate Faculty require adherence to, and will not deviate from, established deadlines or standards of scholarship.

PURPOSE OF THE M.S. GEOSCIENCE DEGREE PROGRAM

The Master of Science Geoscience Program prepares graduate students to become independent, creative, critically evaluative, practical, and professional scientists with excellent written and oral communication skills. The Master of Science Geoscience Program is distinguished from the Baccalaureate programs in that the emphasis is placed upon your accumulated growth from preceding knowledge and skills, as well as on fostering independence, motivation, and application. The Graduate Faculty offer a wide-ranging scope of research interests that allow graduate students to become more involved in scholarly activities, including opportunities for local, regional, and international field observation and data collection, database construction, environmental and statistical modeling, and spatial analysis.

In addition to degree-program requirements, graduate students also are afforded a variety of teaching and independent, collaborative research opportunities beyond those completed for their thesis. During their first year, graduate students may be called upon to deliver guest lectures in their specialty area and to provide academic support in the department. In the second year, qualified graduate students may teach designated courses as the instructor of record, and they are expected to present research findings at professional conferences as well as publish research in leading peer-reviewed journals.

Overall, the purpose of the M.S. Geoscience program is to provide the necessary techniques and opportunities to analyze the physical environment and the human aspects of place, space, and time in an effective and successful manner. In a sense, once you defend your thesis and graduate, you will truly be a “Master” of Geoscience.

GRADUATE STUDENT ORIENTATION

All incoming and returning Geoscience graduate students are required to attend the Department of Earth, Environmental & Atmospheric Sciences Graduate Student Orientation meeting held the week prior to the beginning of classes each Fall semester (typically convened the week before classes begin). During this orientation, students are introduced to the faculty and staff, facilities, and current departmental protocols. Program requirements and expectations are explained, and any questions or concerns are addressed.

WHO WE ARE AND WHAT WE DO: AN INTRODUCTION TO THE GEOSCIENCE FACULTY

The WKU M.S. Geoscience program has a total of 14 full-time graduate faculty members who conduct research in a variety of geosciences fields. They are supported by adjunct graduate faculty in the department, across the university, and from around the world who serve in an advisory capacity on graduate committees. Adjunct graduate faculty may also teach a graduate-level course from time to time. Graduate faculty are appointed by the Graduate Council of the WKU Graduate School and are authorized to serve as primary academic advisers for incoming graduate students. In Table 1, you can find the list of full-time graduate faculty, along with their contact information and main research concentrations.

The faculty are deeply dedicated to your success, so to achieve your goals you should plan to work closely with those faculty who share your interests. The faculty have a wide variety of specializations, but as diverse as these research areas might be, there are many intersections and complementarities within these specializations and, thus, limitless opportunities for collaboration across several fields within the geosciences and beyond. We encourage you to take a holistic approach to your degree work and your development as a scholar in the geosciences. Keep this in mind when you form your thesis committee. It is not uncommon, for example, for students with an interest in GIScience to have a cultural geographer on their thesis committee or vice versa.

Table 1: Alphabetical Listing of Geoscience Graduate Faculty eligible to advise theses.

Name	Contacts	Concentrations	Research Areas
Dr. Brotzke	EST gerald.brotzge@wku.edu	Climate Science Meteorology	<ul style="list-style-type: none"> • Surface instrumentation, radar and storm-scale meteorology • Climate prediction and statistics
Dr. Joshua Durkee	EST 362 270-745-8777 joshua.durkee@wku.edu	Climate Science Meteorology	<ul style="list-style-type: none"> • North and South American mesoscale convective system climatology, precipitation characteristics, and impacts • Climatology and dynamics of convective and nonconvective high-winds events • Atmospheric circulation and teleconnections • Remote Sensing and GIS applications in the atmospheric sciences
Dr. Xingang Fan	EST 360 270-745-5980 xingang.fan@wku.edu	Climate Science	<ul style="list-style-type: none"> • Numerical weather simulation and prediction • Regional climate modeling and prediction • Land surface-air interaction and modeling (deforestation/afforestation, urbanization impact) • Data assimilation • Climate downscaling for regional applications
Dr. Nahid Gani	EST 321 270-745-2813 nahid.gani@wku.edu	Physical Science GIScience Environmental and Climate Science Geology	<ul style="list-style-type: none"> • Tectonic Geomorphology • Low-temperature Thermochronology • Geochronology • Remote Sensing and GIS (geological, climate change and environmental applications) • Geomorphology, Landscape and riverscape evolution, and Earth Surface Processes • Structure and Tectonics
Dr. Royhan Gani	EST 317 270-745-5777 royhan.gani@wku.edu	Physical Science Climate Science Geology	<ul style="list-style-type: none"> • Sedimentary Geology • 3D Seismic, well log and core integration • Fluidflow in the subsurface • Paleoclimate
Dr. Gregory Goodrich	EST 431 270-745-5986 gregory.goodrich@wku.edu	Climate Science	<ul style="list-style-type: none"> • Climate teleconnections • Multi-decadal climate variability • Drought and environmental vulnerability • Statistical climatology • Winter storm analysis
Dr. Margaret “Peggy” Gripshover	EST 309 270-745-3032 margaret.gripshover@wku.edu	Cultural Science	<ul style="list-style-type: none"> • Cultural geography • Historical geography: landscape change • Economic geography: specialized agriculture, urban development • Sports geography: baseball, horse racing • Geography of KY, American South and Midwest
Dr. Chris Groves	EST 401B 270-745-5974 chris.groves@wku.edu	Physical Science Environmental Science	<ul style="list-style-type: none"> • Karst science • Hydrogeology and geochemistry • Water resources • Geomorphology
Dr. Pat Kambesis	EST 435 270-745-5984 pat.kambesis@wku.edu	Physical Science Environmental Science Geology	<ul style="list-style-type: none"> • Karst science • Hydrogeology and geochemistry • Cave science • Geomorphology and geology
Dr. Mike May	EST 335 270-745-6891 michael.may@wku.edu	Physical Science Environmental Science	<ul style="list-style-type: none"> • Sedimentology and Stratigraphy

			<ul style="list-style-type: none"> • Basin Analysis including correlations involving geophysical logs, outcrop, and other subsurface databases • Sedimentary Petrology (both siliclastics and carbonates) • Environmental Geology (hydrostratigraphy and Earth hazards)
Dr. Leslie North	EST 436A 270-745-5982 leslie.north@wku.edu	Environmental Science Physical Science	<ul style="list-style-type: none"> • Karst Environments (management, education, and evaluating anthropogenic disturbance) • Environmental Education (how people learn and the most effective tools of communicating science) • Environmental Sustainability • Water Resources Management • Eye-tracking for data visualization and education
Dr. Jason Polk	EST 407 270-745-5015 jason.polk@wku.edu	Physical Science Environmental Science	<ul style="list-style-type: none"> • Karst geomorphology and hydrology • Paleoclimate reconstruction • Water resources • Isotope geochemistry • Human impacts in caves/karst environments
Dr. Zachary Suriano	EST 428 270-745- zachary.suriano@wku.edu	Meteorology Climate Science	<ul style="list-style-type: none"> • High-impact meteorological and hydrological phenomena • Understanding the role of atmospheric circulation in forcing hydroclimatic variability in regional climates • Impacts of hydrologic variability on people and the environment over time
Dr. Jun Yan	EST 333 270-745-8952 jun.yan@wku.edu	GIScience	<ul style="list-style-type: none"> • Spatial quantitative methods • Urban and regional analysis, especially transportation-related • Crime analysis • GIS applications in healthcare services • Environmental issues in karst regions

HOW TO SUCCEED IN THE M.S. GEOSCIENCE PROGRAM

Your pursuit of the graduate degree in the Geosciences will be an exciting, challenging, and rewarding experience if you are willing to step up and accept the responsibilities associated with the completion of your Master's program. One of the biggest adjustments you will make as you transition from your undergraduate degree program to the Master's level is that the expectations from your professors will have dramatically changed and, perhaps most importantly, you will have to take complete responsibility for your development as a scholar and expert in your field of interest. In other words, you have to take ownership of your education as a Master's student.

Changes in Expectations

In your undergraduate days, the level of expectation was that you were able to climb, say, a small mountain with a lot of assistance and some safety nets. In your time as a graduate student, you will be asked to climb not just one mountain, but several (and even bigger ones!) with some assistance but without much of the hand-holding that you benefited from as an undergraduate. In other words, this is *your* Master's degree. Your ability to see your program from start to finish will be largely on your shoulders. For example, as an undergraduate student, you may have had an assignment to read a journal article by a particular scholar in your field and you (it is hoped!) followed those directions and completed

your assignment. As a graduate student, a professor may also assign an article for you to read and review and if that is all you do---read that one article and take notes---you will not have met your graduate professor's expectations. What that professor is really telling you to do is to read that one article but also to go out and find out something about the author and perhaps what else this person has written on the subject. This is what we mean by the changes in expectations. As a graduate student, we open a door for you and then you have to go through that door and explore what might be on the other side---on your own and without any prompting. This is how you truly develop into a mature scholar. Indeed, there is no substitute for you taking personal responsibility for building your scholarly competence by reading widely and critically, writing constantly and professionally, and going beyond the average.

We have set the bar quite high and you have to make that leap. The faculty are here to mentor you along the way, and to point you in the right direction, but you are the one who will make the big decisions and have to make sure that all the requirements and deadlines have been met. It is a big challenge, but if you succeed, you will benefit from the rewards of your Geosciences M.S. degree for many years to come.

Going Pro

Another aspect of your graduate education that is different from your undergraduate days is that you will also be expected to seek out and participate in professional development opportunities. You are no longer an amateur: when you are in graduate school, you are going pro! We fully expect all of our Geoscience graduate students not only to attend professional meetings and conferences, but also to present their research in poster or paper sessions. Graduate students should also submit their research for publication, typically with a faculty co-author, in a peer-reviewed journal appropriate to their field of interest. Your thesis advisor will help you identify journals that would be good places to start your publication career. To support your research, you should search high and low for funding from the departmental, college, university, and even from external agencies. There are a wide variety of funding sources, but with tight budgets and high competition for scarce dollars, be sure to try every option and apply early to increase your chances of success. For more information on funding and other development opportunities, see the section of the handbook titled, "Resources for Graduate Students."

Stay in School!

One of the most important things you can do to increase your chances of completing the degree program is to remain in residence until you have successfully defended your thesis. While the temptation to seek gainful employment before you graduate will be great, be aware that before you lie the scattered remains of unfinished Master's degrees from those who chose to get a job before finishing their programs. You may think that you are the exception and that you can do two things at the same time - work full-time and finish writing your thesis - but consider this: writing a thesis is a full-time job in and of itself. Do not underestimate the amount of time, energy, resources, blood, sweat, and tears it will take to finish the research, writing, and editing of your thesis. **More than two-thirds of all students who leave our program before defending their thesis do so without ever earning their Geoscience M.S. degree.** Don't drop out of your Master's degree program for a job—stay in school!

The Best Years of Your Life!

Before you think that earning a Master's degree is nothing but torture, disappointment, and terror, we should say that we expect your experience to be one of the best of your educational career. Not only will you have the satisfaction of achieving this major accomplishment—holding a Master's degree diploma in your hand—but you will also forge relationships with faculty and student colleagues from which you will benefit your entire life. Many graduate students say that their time in the graduate program was the best years of their lives and the friends they made in the program are friends for life. You never know—those same friends may be the ones who help you get your first job! There are many opportunities here at WKU to expand your network of professional and social contacts beyond the department, college, and university walls. Take time to explore our community, seek out service-learning opportunities, be social, and enjoy

cultural experiences. Earning a Master's degree can be very stressful...be sure to set aside some time to have some fun!

THE ROLE OF THE THESIS COMMITTEE

The thesis advisor and committee will guide you through your pursuit of the Geosciences M.S degree, so it is imperative to select an advisor and thesis committee with care and much thought. Your thesis committee will consist of your advisor and at least two other members of the Geoscience graduate faculty for a total of three committee members. You may have additional committee members either from within or outside the Department of Earth, Environmental & Atmospheric Sciences, College, or University, but that will be decided through discussion with your advisor.

A Little Help From Your Friends: Your Advisor and Committee

As part of the program application process, you negotiated a commitment from a graduate faculty member to work with you on your research project and to serve as your primary thesis advisor (director). However, during the course of your first semester in the program, you may find that another faculty member is best suited to your research interests. If that is the case, you should discuss with your current advisor your intentions to change your thesis advisor and then negotiate a written commitment from another faculty member to serve as your primary advisor before the end of your first semester in the program. Meeting with multiple faculty members to discuss potential thesis projects and identify professors with closely aligned research interests is advisable. Each student is responsible for seeking a graduate faculty member to serve as the thesis advisor, yet the decision is made upon mutual agreement between the student and the professor. During the Fall semester, the structure of GEOS 500 Research Methods is geared to help you develop a defensible thesis proposal, with hands-on guidance from both your thesis director and from the course instructor. Each student is required to meet with his/her thesis director at least once weekly during the semester. During the GEOS 500 course, you will also develop your thesis committee. Your thesis committee should be established by the end of the first semester, but definitely no later than the end of the first academic year.

The thesis advisor should be available to answer any questions posed by the student, and guide the student towards timely and successful degree completion. You should plan to meet regularly with your advisor to discuss all aspects of your graduate program, including developing a research project and choosing appropriate courses. Do not wait for your advisor to come looking for you! Students who fail to keep in close contact with their advisors are more likely to take longer than two years to graduate or are more likely to drop out of the program. You should also work closely with the advisor to identify appropriate graduate committee members. It is the responsibility of both the student and the major advisor to involve the other committee members in the student's progress.

Working with Your Thesis Director (Advisor)

The role of your graduate faculty advisor is quite different from that of undergraduate major advisors, who you most likely met with only occasionally to discuss course selection and class scheduling. Your graduate faculty advisor will do all that your undergraduate advisor may have done but much, much more. The selection of your Master's in Geoscience advisor may be the most important decision you make as a student because your advisor will be the one who guides you through your program from the very beginning of your coursework and conceptualization of your research, to the thesis defense and, finally, to graduation. Your advisor will help you choose a thesis topic, determine the best research methodology, and make sure that your thesis is accurate, well-written, and completed in a timely fashion. Your advisor will also chair your defense and administer your comprehensive exams. Your advisor will serve as your

advocate and write letters of recommendation on your behalf for employment or even for admission to a Ph.D. program. In short, by taking you on as a student, your advisor is committing to a major endeavor and is dedicating himself or herself to your success. Needless to say, choose wisely and do your best to cultivate the most positive and productive relationship. A key part of this is communication. It is your responsibility to seek out your advisor for guidance and consultation. Don't let any issues or problems fester too long or don't wait for your advisor to come looking for you! Seek out help from your advisor, follow his or her advice, and you will have less stress and more success.

How to Select an Advisor

While you certainly want to pick an advisor based upon shared research interests, given a choice, it is also best to find one with a similar temperament that you feel comfortable with – because you will spend quite a bit of time with him or her – a *lot* of time. Chances are you will have a much more one-on-one relationship with your graduate program advisor than with any other faculty member. Take a look at Table 1, “Who We Are and What We Do,” to find a good match not only for an advisor but also for your thesis committee members. Please note, however, that not all matchmaking has a happy ending. If, at some point, you decide that you want to change advisors, you are certainly entitled to do so (same for changing members of your thesis committee). For example, if a faculty member is extremely busy and already has many graduate student advisees, he or she might not be the best committee member because of time constraints. In other cases, your original research may shift and someone else in the department may be a better fit as an advisor. If you choose to change advisors or committee members, however, please do so in a professional manner. Speak in person with the faculty member in question and depart on good terms. Burning bridges in graduate school may lead to your career going up in smoke!

You and Your Advisor: Team Effort

While your thesis certainly has your name on it, it also has the names of your advisor and your thesis committee members, so think of your thesis as a team effort. Your advisor is the coach and you are the team captain! Your advisor and committee members will be called upon to sign official paperwork as well as edit your thesis drafts. So, ultimately, your advisor and thesis committee members are responsible to the Department and the University for the quality and integrity of your work. Your thesis team wants you to give your best at all times because you and your work are a reflection of their performance as a committee.

Your Thesis Committee: The Board of Directors

Just as it is important to select the right advisor, it is likewise paramount to assemble a cohesive, cooperative, convivial, and complementary thesis committee. Once you have decided on an advisor, look for two other faculty members to round out your committee. You will have a minimum total of three members on your committee—your advisor and two other graduate faculty members from EEAS. Additional committee members from the Department, College, or from outside the university may be added at the discretion of your advisor to make a minimum total of three (more may be added, if your advisor deems it appropriate).

Think of your advisor as the CEO of your thesis and the thesis committee as the board of directors. The committee members will offer their advice and suggestions to improve your thesis and help you produce a high-quality final product. The thesis committee reviews and approves your thesis proposal and thesis. They write your comprehensive exam questions (along with your advisor), evaluate them, and report their assessments back to your advisor. The thesis committee members are also representatives of the Department and University and will ensure the quality of your work so that it represents WKU well. But, their most important role is to offer impartial research advice and opinions without the weight of the advisor/student relationship. Consider any and all suggestions and advice from your committee members, but do keep in mind that your advisor has the final say regarding your research.

The Departmental Thesis Reader

Just like the peer-review process of a professional journal, your completed thesis must conform to a certain standard of research and writing quality. Your thesis advisor will serve as the final reader of the thesis document prior to final submission to the Graduate School by the indicated deadline in a given semester. Theses should follow the writing and formatting guidelines provided by the Department. The writing quality, scientific rigor, and formatting of the final thesis document should be of the highest standard achievable, consistent with the requirements of the Graduate School and Department, and approved by the thesis committee, with final approval from the advisor, upon final submission. The final review will focus on grammar, syntax, flow, formatting, consistency, and application of the Graduate School formatting requirements. See Appendix I below for general Departmental guidelines for structuring and editing your thesis to meet the Departmental and Graduate School standards.

Geoscience Degree Options/Concentrations

Prospective and currently enrolled Geoscience graduate students are tied to the M.S. program requirements in place during the academic year of first enrollment. Current program options and course requirements are listed on the departmental website at: <https://www.wku.edu/eeas/graduateprogram.php>

The M.S. Geoscience program is structured around five major areas of concentration: Physical Science, Environmental Science, GIScience, Climate Science, and Cultural Science. All students are required to take GEOS 500 (3 hours) and GEOS 502 (3 hours) in the Fall semester of their first year, followed by a geostatistical techniques course (typically GEOS 520 -3 hours) in the Spring semester. Incoming students must have earned a “C” or better in a foundational spatial statistics course (e.g., GEOG 391 at WKU) and a foundational GIS course (e.g., GEOG 316 or 317 at WKU) as a requirement of admission to the program, or other acceptable preparatory coursework identified and approved by the thesis director. Keep in mind that any undergraduate courses cannot be counted towards your 30-hour required graduate credits as they are not graduate-level courses. If taken while enrolled as a graduate student, you will be expected to pay graduate, not undergraduate tuition pricing. For a suggested semester-by-semester course timeline, refer to page 14 of this Handbook.

Resources for Graduate Students

- Office space is assigned in the Department or within faculty labs pending GA assignment. Students should talk to their primary advisor about office space assignments and other basic support resources. Please remember, however, that office space is a privilege, not a right. Your space may be taken at any time, particularly if you are not making effective use of the space, making appropriate progress in the program, not fulfilling graduate/teaching assistant duties, or abusing/misusing the assigned space.
- Travel funds to attend and present research at local, regional, national, and international conferences are available upon request. A travel funding application form and a permission-to-travel form should be completed as early as possible, as funds are extremely limited. Students should consult with their primary advisor on appropriate venues for dissemination of their research and for funding support opportunities.
- Research support funds are available from the Department, the Ogden Dean’s office, the Graduate School, and from a variety of state and federal agencies as well as private sources. Graduate students should be creative, proactive, and diligent in seeking out funding sources outside the Department.
- Graduate Assistantship and/or Research Fellow funds are competitive and are linked to departmental research centers and teaching opportunities. First-year students who have been awarded assistantship support are assigned either to a research center or a faculty member, and sometimes both. Students awarded a half-time assistantship are required to work 20 hours on average each week during the regular semester and are expected to support the Department as

assigned. Students awarded a quarter-time assistantship are required to work 10 hours on average each week during the regular semester and are expected to support the Department as assigned. Students may be eligible for a second year of funding upon the recommendation of their primary advisor and the endorsement of the Department Chair.

- If you would like to teach a course in your second year, Graduate Instructors (GI) may be available for second-year graduate students. Applicants for GI designation are required to: (a) complete a GEOS 595 Teaching Practicum in the Spring semester of the first year by shadowing a faculty member in a course the student wishes to teach; (b) complete a required sequence of GATI training opportunities during the Spring semester of the first year (refer to the current policy requirements on the Graduate School website at http://www.wku.edu/graduate/aid/ga/grad_assistant_instructor.php) and for GATI specifics at (<http://www.wku.edu/cfd/gati.php>); and (c) complete a minimum of 18 graduate hours before the teaching assignment begins. In the event that GEOS 595 cannot fit into the student's regular schedule of 9 hours in the Spring semester of the first year, the student may satisfy the practicum requirement by working closely with a graduate faculty instructor of record, developing course content, and giving lectures during the semester in the content to be taught that are evaluated and documented by the supervising faculty member, and submitted to the Department Chair for approval. In addition, the Department will follow Graduate School guidelines for regular evaluation of the GI during the teaching semester(s), as detailed in WKU Policy 1.1130 (<https://www.wku.edu/policies/docs/21.pdf>) and in WKU Policy 1.3070 (<https://www.wku.edu/policies/docs/39.pdf>).
- Students are expected to write effectively and coherently. Students who are weak writers and/or who know that they have some deficiencies in grammar and syntax should take advantage of the various writing support opportunities on campus. Above all, edit, edit, edit constantly and never be afraid to seek professional help with your writing. Remember that your thesis committee cannot and will not write your thesis for you!

Departmental Policies

Students should first consult this Handbook for appropriate solutions to issues and problems relating to standard procedures before approaching their primary advisor. If an appropriate solution cannot be determined, consult with the Department Chair.

WKU has a standard procedure for addressing and resolving complaints. First, any student with a legitimate complaint related to procedures, processes, paperwork, resources, faculty relationships, or coursework should bring the issue to the attention of the primary advisor in an informal manner. If the problem cannot be resolved informally, the student should next submit a written complaint with appropriate evidence to the primary advisor. The advisor should review the written complaint and forward it to the Department Chair with a recommendation for resolution. The Department Chair will consult with the advisor and with the student in order to resolve the issue. If the issue cannot be resolved, the student may file a formal complaint with the Dean of Ogden College, supported by appropriate evidence. Refer to the WKU Student Handbook for guidelines and procedures.

If for any reason you confront issues with which you do not feel comfortable talking to your advisor, or have issues arise with him or her directly, please see the Department Chair immediately.

Program Steps and Milestones

As with any major undertaking, the final goal is achieved by advancing through a series of steps. You will get to the finish line (graduation) as long as you don't trip up! Those who stumble along through their Master's degree program often do so because they did not follow the proper sequence of steps from start

to finish. The Geosciences Master's program is designed to be completed in two years (four regular semesters). If you want to complete your degree on time you need to be mindful of the various requirements and deadlines that must be met before graduation. Make your life easier and your goals much less painful to achieve by using this section of the Geosciences Graduate Student Handbook to navigate a safe and secure course from the first semester to your fourth.

What Courses Do I Need to Take?

To complete your Geosciences M.S. degree you will need to complete a minimum of 30 semester hours at the graduate-level, including 24 hours of coursework and six hours of thesis credits (GEOS 599) in sequence. The Department does not pay for, nor does it encourage, undergraduate coursework during the residency period.

Required Program Courses (from Fall 2016 onwards)

The Geoscience Graduate Program requires the following courses:

- Geoscience Research, GEOS 500 (3 credit hours)- fall semester.
- Geoscience Research Methods, GEOS 502 (3 hours)- fall semester.
- Geoscience Statistics, typically GEOS 520 (3 credit hours) or an approved statistical/analytical course- spring semester
- 15 hours of appropriate elective coursework, selected in consultation with the thesis committee from appropriate concentration.
- GEOS 599 (6 hours total), taken after completion (18 hours) or concurrently (24 hours) of graduate credit.

An appropriate course may be substituted for the field/methods and/or analytical requirement detailed above with the written approval of the thesis director and the Department Chair.

Concentrate!

Beyond the required core courses, you will focus your elective coursework on your general concentration within the Geosciences based primarily on your research focus. You will need to earn a **minimum of 15 credit hours of electives** related to this research topic. *Be sure you consult with your advisor to ensure you are taking the appropriate required courses.* A maximum of six hours of advisor-approved electives that are consistent with the student's research area interests may be selected from other departments or from other Geoscience concentrations. Courses not on these lists **may be substituted** as electives with the permission of the thesis director and the Department Chair. A maximum of **six hours, or two courses, of GEOS 510 independent** coursework may be applied to the program. Typical examples of course concentrations are below.

Electives in Physical Science:

GEOS 502 Field Research	3 hours
GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	3
GEOS 521 Geomorphology	3
GEOS 559 Hydrological Fluid Dynamics	3
GEOS 566 Karst Geoscience	3
GEOS 595 Geoscience Practicum	3

Electives in Cultural Science:

GEOS 501 Geoscience and Development	3
GEOS 507 Concepts & Skills Teachers	3
GEOS 510 Research Topics	3

GEOS 525 Political Geography	3
GEOS 540 Regional Geography	3
GEOS 550 Economic Geography	3
GEOS 580 Sustainable Cities	3
GEOS 585 Population Geography	3
GEOS 595 Geoscience Practicum	3

Electives in Geographical Information Science:

GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	3
GEOS 517 Advanced Spatial Databases	3
GEOS 575 GIS Modeling & Analysis	3
GEOS 576 GIS Programming	3
GEOS 577 Special Topics in GIS	3
GEOS 584 Advanced Planning	3
GEOS 590 Experimental Design	3
GEOS 595 Geoscience Practicum	3

Electives in Environmental Science:

GEOS 505 Biogeography	3
GEOS 506 Environmental Seminar	3
GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	3
GEOS 543 Env. Science Concepts	3
GEOS 544 Environmental Ethics	3
GEOS 555 Global Climate Change	3
GEOS 571 Quality of Life	3
GEOS 595 Geoscience Practicum	3
GEOL 415G Environmental Geology	3

Electives in Climate Science:

GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	3
GEOS 522 Physical Climatology	3
GEOS 526 Applied Meteorology and Climate	3
GEOS 531 Dynamic Meteorology I	3
GEOS 533 Synoptic Meteorology	3
GEOS 535 Dynamic Meteorology II	3
GEOS 537 Mesoscale Meteorology	3
GEOS 538 Physical Meteorology	3
GEOS 539 Atmospheric Modeling	3
GEOS 595 Geoscience Practicum	3

From Orientation to Graduation: Semester-by-Semester Milestones

Prior to the first semester, when possible, complete any prerequisites, such as GEOG 391 (Spatial Statistics) and GEOG 316 or 317 (GIS), or important supporting coursework deficiencies (math, physics, chemistry, etc.). Again, keep in mind that these or other undergraduate courses **cannot** be counted toward your 30-hour required graduate credits, as they are not graduate-level courses. Your primary advisor is

appointed as part of the admissions process. Stay in contact with your primary advisor during the summer before the first semester begins.

First Semester (Typically the Fall)

- Enroll in GEOS 500 (3 hours) and GEOS 502 (3 hours).
- Enroll in other required or elective courses and any program deficiencies (REMINDER: All courses taken as an enrolled graduate student must be passed with at least a “B” grade. Cumulative GPAs below 3.0 will void any graduate assistantship funding and will place you on graduate probation. Only courses taken at the graduate level are eligible to be counted as part of your graduate degree).
- Select your thesis committee no later than the end of the first semester (~December 15th).
- Develop a thesis proposal – completed as part of the GEOS 500 curriculum process.
- work with your advisor to submit your Program of Study Form online through TopNet prior to earning 12 hours of graduate credit. Work with you Advisor on this form.
- Ensure DegreeWorks program of study is correct no later than December 15th.

Second Semester

- Enroll in GEOS 520 or approved statistical/analytical course (3 hours).
- Enroll in other required or elective courses as determined by your program concentration.
- Enroll in GEOS 595 Teaching Practicum and begin the GATI required training sequence if approved for a second-year teaching assignment:
http://www.wku.edu/graduate/aid/ga/grad_assistant_instructor.php
- Defend your thesis proposal by the end of the semester and **submit the Committee and Topic Selection form (completed online by your advisor)**, with copy to the Department Chair and Office Associate: https://www.wku.edu/graduate/students/committee_selection.php
- Check with your primary advisor at the end of the Spring semester to make sure that an assistantship evaluation of your academic and research performance has been submitted to the Department Chair. Assistantships cannot be renewed without a formal written evaluation on file.
- You **MUST complete your application for graduation** after you have earned 18 credit hours.
- **Complete your FAFSA** for the next academic year so you remain eligible for student employment.

Third Semester

- If you failed to defend your thesis proposal at the end of the previous Spring semester (not a good idea!), do so as soon as possible. Please have your advisor work with the Office Associate to indicate how many hours of thesis you require the next semester so she can enter the appropriate course pass. She will email you when the course pass has been entered.
- Complete any outstanding coursework to meet the 24-hours required before you sign up for GEOS 599 Thesis Research. You may enroll concurrently in three hours of thesis if you are completing your 24 hours of coursework in this semester. For other circumstances, discuss your situation with your thesis advisor and the Department Chair.
- Take (and pass!) your **comprehensive exam** by the last week in November (after the completion of at least 18 hours of coursework). You cannot take your comprehensive exams until the thesis proposal has been defended and approved. Students should schedule an eight-hour block of time for taking the comprehensive exam.
- You **MUST complete your application for graduation** after you have earned 18 credit hours.

Fourth Semester

- Register for thesis hours GEOS 599 (Research Thesis), depending on how many thesis hours you took the previous semester. You **MUST** have successfully defended your thesis proposal before registering for GEOS 599 credit.
- If you have no hours required to complete the program, then register for GEOS 600 Matriculation (not included in the 30-hour requirement). If you need to satisfy stipend, financial aid, or insurance requirements, discuss your course registration hour requirements with your advisor. All graduate students are required to register for at least one hour each semester until graduation, with the exception of summers if you are not graduating during the summer.
- Develop a timeline for defending and submitting your Thesis. Check the submission deadline (typically three or more weeks before the Graduate School thesis submission deadline) and count back from that date. You should plan on submitting your final, revised thesis to your committee no less than two weeks prior to your defense. Remember that procrastination on your part does not require the thesis committee to go into crisis mode and rush through the completion process. If you fail to meet any of the deadlines, you cannot graduate that semester.
- Once your thesis has been defended and approved by your committee and advisor, it will be submitted to the Graduate School with the digital signature page, and **you and your advisor should complete:**
 - **the Comprehensive Exam/Capstone Completion Form**, which your Advisor will submit through TopNet by the deadline set by the Graduate School for that semester.
 - **Copyright Permission form (completed by student):**
https://www.wku.edu/graduate/students/thesis/copyright_permission.php
- Make sure you have completed your application for graduation with the Registrar's office. You **MUST** complete your application for graduation after you have earned 18 credit hours.
- Walk during the graduation ceremony and receive recognition for completing your M.S. program.

Beyond the Fourth Semester

- There are occasions when circumstances require residence or enrollment beyond the second year. Although this is highly discouraged, you must continue to be enrolled and fully engaged in completing your program. Students are strongly advised not to accept full-time employment before completing the thesis project.
- You must be enrolled for GEOS 600 Matriculation (one hour) each Fall and Spring semester while completing the thesis. If you fail to register for GEOS 600 for any semester, you are automatically dismissed from the program. Subsequent readmission will require you to reapply to WKU for graduate study and to be approved for readmission by your thesis committee and by the Department Chair. Readmission requires subsequent completion of the thesis within one academic year of the readmission decision. Failure to complete all M.S. Geoscience program requirements within one year of readmission will result in final dismissal from the program with no appeal and no possibility of readmission.

Thesis Proposal

To fulfill the requirements of the Geosciences degree program, students will complete and report on a research project (a thesis) to demonstrate that the student can design and execute research. As part of this process, working closely with a faculty advisor, students will develop a plan of action (thesis proposal) for executing their thesis research. The proposal should be completed and defended by the conclusion of the second semester in the graduate program.

Planting the Seeds: Developing a Research Topic

Working with your graduate advisor, you should begin researching potential thesis topics during your first semester. Although this process is embedded in the curriculum for GEOS 500, you should be prepared for a serious time investment in putting the proposal together. This process should be initiated by reviewing

existing literature in journals, books, completed theses, citation indexes, abstracts, etc. The Graduate faculty cannot stress enough how necessary it is for your intellectual development at the graduate level that you read broadly and deeply – you are expected to “Master” the literature on research methods, theories, and practices in your chosen area of concentration. Students are *encouraged* to engage in professional academic discourse with faculty members and fellow students to develop research ideas, and are *required* to narrow the scope of the topic with the advice of the graduate advisor. To increase your chances of success in the program, you should seek a topic that you are passionate about, that is of interest to your advisor, that you can complete in a timely fashion (leave topics such as “Life, the Universe, and Everything” for later in your career!), and that supports your future career goals.

How exactly does one go about developing a research problem that leads to a thesis proposal and, ultimately, to a final thesis defense? The Geoscience Research course (GEOS 500) is, in part, designed to help you formulate your thesis topic, define research questions, review applicable literature, establish a research design, and develop a thesis proposal. Students are required to enroll in this course during the Fall semester of the first year in the program. Please note this course is only offered in the fall semester. You **MUST** work closely with your advisor to produce your thesis proposal, but GEOS 500 will give you the tools and experiences you need as a developing scholar to craft a defensible document. Keep in mind that you must defend your thesis proposal by the end of your second semester, so take advantage of what you learn in GEOS 500, continue to work closely with your advisor, and you will get to that milestone.

A Decent Proposal: The Right Way to Write One

Once you have defined your thesis topic, you will prepare a well-written, formal proposal that convinces the reader of the validity of research questions and need for the intended research. The purpose of the proposal is to demonstrate that:

- The student’s thesis topic addresses a significant problem or question within his or her field of study.
- The researcher has working knowledge of the literature and can justify how the thesis will fill a gap within the existing literature on the topic.
- A methodology for collecting/obtaining data to address the research question(s) is developed.
- Appropriate and sufficient data analysis methods are identified.
- The student has established a realistic time frame within which a rigorous project can be carried out (*in other words, is it “doable” within the remaining two semesters?*).

Thesis proposals should meet scholarly standards for both writing and presentation. Moreover, the student is responsible for upholding ethical and scholarly responsibilities for every element of his or her proposal and thesis. Complete and accurate citations should be provided for any ideas not those of the author and should at no time even come close to plagiarism. Failure to uphold the ethical/scholarly standards set by the Department and the university is grounds for immediate dismissal from the Geoscience program. If you aren’t sure what plagiarism is or need further clarification of the consequences of academic dishonesty, consult these and many similar web sites:

<http://people.wku.edu/jan.garrett/dptengpl.htm>

<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

<http://owl.english.purdue.edu/owl/resource/589/01/>

http://www.writing.northwestern.edu/avoiding_plagiarism.html

Turn the Page: The Length of Your Proposal?

The complete proposal has no specific length, so long as the following components are fully reviewed. The level of detail in the proposal should be complete and yet concise enough to serve as a guide for the

student for continuing the research project if approved. Students are encouraged to follow the formatting guidelines required by the WKU Graduate School when preparing their proposal, since these guidelines will be used to format their final thesis. The guidelines can be found at:

<http://www.wku.edu/graduate/students/thesis/guidelines.php>

A Recipe for a Good Proposal: Be Sure You Use the Proper Ingredients

Completed proposals should contain the following elements, which should be completed within GEOS 500 and incorporated into the proposal to accurately and completely convey your research intent:

1. Title Page
 - Acknowledgements Page
 - Table of Contents
2. Introduction
 - Briefly describes the context for the proposal and captures the reader's interest
 - What new knowledge is being produced, why is it worth knowing, and what are the major implications?
3. Problem/Thesis Statement, Hypothesis, and/or Research Questions
 - Based on theory, previous studies, and/or researcher observations
 - Should capture the goal of the thesis project and help establish its boundaries?
4. Literature Review
 - Significant findings from previous studies relevant to the thesis project
 - Often provide the basis for formulation of research hypotheses (questions)
5. Research Design/Methodology
 - How will data (quantitative and/or qualitative) be collected?
 - Where will data be collected (primary and/or secondary sources)?
 - What Methods will be used to analyze data?
6. Expected Outcomes
 - Discussion of expected research outcomes and their significance to the body of literature
7. Timeframe for completion of the work
 - A realistic timeframe within which a rigorous, yet feasible research project can be completed outlined in detail
 - Indicate deadlines for completing each stage of the project
 - List any work you have already completed
8. References
9. Appendices (when applicable)
 - Data sheets, questionnaires, survey question templates, IRB approvals, etc.

Effective Writing

It bears repeating that students are expected to write effectively and coherently. A minimum score of 3.5 on the writing component of the GRE is required for admission. Students who are weak writers and/or who know that they have some deficiencies in grammar and syntax should take advantage of the various writing support opportunities on campus. Above all, edit, edit, edit constantly and never be afraid to seek professional help with your writing. Remember that your thesis committee cannot and will not write your thesis for you! All graduate students are strongly advised to own and use a copy of Turabian's *Manual of Style*, and to follow the citation format of the leading journal in their research concentration (for example, cultural geoscientists would follow the citation style used in *Geographical Review* or the *Annals of the Association of American Geographers*). As a departmental default, use A.P.A. or Harvard style (author, date in the text, with author, initials, date. Article title. Journal Title xx(xx): xxx-xxx in the references. For example:

Harley, G.L., Reeder, P.P., Polk, J.S., van Beynen, P.E., 2010. Developing a GIS-based inventory for the implementation of cave management protocols in Withlacoochee State Forest, Florida. *Journal of Cave and Karst Studies* 72(1), 35-42.

or

Keeling, D.J., 1996. *Buenos Aires: Global Dreams, Local Crises*. New York, N.Y.: Wiley Academy Press.

Thesis Proposal Defense

For full-time students, the oral defense of the thesis proposal must be completed by the end of the students' second semester in the graduate program. Each student must provide the written thesis proposal to his or her Graduate Committee and have his or her advisor send the Thesis Proposal Defense Request Form (see website) to the Department and University community to announce publicly your defense a minimum of two weeks (14 days) prior to the oral thesis proposal defense date. The thesis proposal should incorporate most of what you worked on in GEOS 500. Work with your advisor to schedule a presentation room. It is your responsibility to ensure that this process is completed in a timely fashion. At a minimum, two-thirds of the graduate committee must be present at the defense.

After the written thesis proposal has circulated to the major advisor and committee members, students will give an oral presentation of their proposed research in a formal, public defense. Anyone is welcome to attend a defense---other faculty, students, literally anyone in the general public. Graduate students are encouraged to attend the proposal and final thesis defenses of their peers to get a sense of how the process works and how to prepare for these important events in your academic life.

Although the structure may vary, usually the graduate student prepares a PowerPoint presentation (average 30 minutes) detailing his or her research proposal and then fields questions from those in attendance. The graduate committee will offer feedback to the student and clarify any questions, with the intent of assessing the feasibility of the proposed project and the ability of the student to undertake said project. Once all questions and discussion are concluded, the graduate committee will either approve the proposal and/or make recommendations for how the project should be changed, or, in some instances, the committee may decide the thesis topic needs substantial revisions and can request that the proposal be resubmitted and another oral defense scheduled.

If the oral proposal defense is successful, the graduate advisor and student are responsible for providing a copy of the approved thesis proposal with the Department. The student and graduate advisor are also responsible for keeping a copy of the document for their records. The Committee and Topic Selection Form must be completed by the advisor and committee members and filed with the Department Chair and Office Manager.

An approved proposal signifies an agreement between the student and the graduate committee. If, for any reason, a thesis proposal topic is discarded or substantial changes to the research design are made after a successful defense, the student must seek approval for the new topic by participating in another formal, public defense.

After the Proposal Defense

After the thesis proposal is successfully defended and a copy of the proposal and approval forms are submitted to the Department, the student should begin with the data collection procedures outlined in the proposal. The student is responsible for obtaining any necessary data collection permits. If the research intends to involve human subjects, the student must complete Human Subjects Research training and complete a research application. Data collection must not occur until the application is approved and all

training is completed. For more information on the Institutional Review Board process, visit: <http://www.wku.edu/compliance/irb.php>.

COMPREHENSIVE EXAM

What is a Comprehensive Exam?

The purpose of the comprehensive exam is to assess your substantive knowledge of your areas of concentration, as well as your understanding of the appropriate theories, methodologies, researchers, and leading literature within your fields of specialization. In other words, have you mastered the subject?

When Do I Take It?

The comprehensive exam is written exam administered at the end of the third semester of your course of study in the Geosciences M.S. program. You must pass your comprehensive exams in the semester before you defend your thesis.

How Do I Prepare for my Comprehensive Exam?

Simple - you cannot prepare for comprehensive exam by cramming! It is certainly advisable to review the courses you have taken and refresh your memory a bit, but these are *comprehensive exams*—they are meant to test your overall accumulated knowledge of your field of specialization and your ability to think on your feet. The majority of the questions are written by the members of your thesis committee, although other graduate faculty are invited and encouraged to submit questions. Normally, at least five questions are assigned to the examinee, with questions selected by the thesis advisor. Students should allocate an eight-hour block of time at a minimum for the comprehensive examination. Work closely with your primary advisor for advice about the comprehensive examination process.

Where Do I Take the Exam?

Your advisor will schedule a room in which you will take your exam.

What is the Format?

The Comprehensive Exam is usually comprised of essay questions written by your thesis committee members and other graduate faculty. Students typically are assigned an eight-hour block of time to complete the exam. Your answers may be handwritten or word processed depending on your advisor's preferences. When the prescribed time has expired, you must submit your answers to your advisor or to the departmental office manager, whoever happens to be available at the time. The student's primary advisor has the ultimate responsibility for monitoring and receiving the comprehensive exam.

What Happens after the Comprehensive Exam?

Once the examination committee has had time to review your comprehensive exam answers, you will be notified as to results of the exam, which will occur within one week of your exam date. If you pass all your questions, the exam is complete. Some students may be asked to rewrite exam answers if the committee is not satisfied with the responses (Conditional Pass). If the comprehensive exam is determined to be a "Fail," then a new set of examination questions will be solicited and the process will begin again as detailed above. If a student fails the comprehensive examination for a second time, the thesis committee, in consultation with the Department Chair, may dismiss the student from the program.

THESIS DEFENSE

Students are expected to defend the thesis in the middle of their fourth semester of study in the Geosciences M.S. program. When your advisor is satisfied that your thesis is “defendable,” a thesis defense will be scheduled.

Thesis Defense Procedures

Students will work with their advisor and thesis committee members to complete a draft of the thesis document including all supplementary materials, in accordance with the formatting guidelines set forth by the Graduate School (https://www.wku.edu/graduate/students/thesis/wku_thesis_guidelines.pdf) prior to holding an oral thesis defense. An example thesis template can be found here: https://www.wku.edu/graduate/students/thesis/example_document_thesis_202210.pdf

The completed thesis draft must be submitted to the Major Advisor and Committee for review and approval at least three (3) weeks prior to holding the oral defense and well in advance of the Thesis Reader submission deadline to allow time for the defense and any corrections. The Thesis Reader deadlines occur early in the semester, so please be aware of them!! Your advisor will approve moving forward to set the oral defense date if the thesis is considered ready to be defended. When approved for holding your defense, your advisor will submit a Thesis Defense Announcement form to make a public announcement to the Department and coordinate scheduling a presentation room.

Living Up to Your Deadlines

One thing that you will soon learn in the course of your graduate studies is that deadlines are set in stone and failure to meet any deadline is, well, deadly. It is in your best interest to be mindful of important dates for each semester. You can safely assume that all deadlines are non-negotiable and do not expect to benefit from any exceptions to the rules. Procrastination or poor planning on your part or by your advisor does not constitute a crisis that must be resolved by the Department.

Scheduling the Defense

The student is required to schedule a public defense of the thesis research at least (two) weeks prior to the defense date. The oral defense of the thesis is open to the University community and publicly advertised by the Department. The oral defense should be announced by the Advisor using the Thesis Defense Announcement Form in coordination with the Department to schedule the room. The date and time will be determined by the student’s primary advisor, in consultation with the student and the Committee, subject to approval by the Department Chair.

The expectation is that you will defend your thesis successfully in the fourth semester in residence in the Geoscience M.S. program. The thesis defense must be scheduled during the spring or fall semester. Do not assume that you will be able to defend your thesis during the summer. Faculty members are not required to perform departmental duties such as thesis defenses during the summer terms when they are not on contract, as many faculty are conducting research in the field or leading study abroad programs. Summer defenses are only scheduled with the unanimous **written** permission of your advisor, committee members, and Department Chair in the preceding spring semester.

Thesis Defense Procedures

The oral defense will begin with an approximately thirty (30) minute oral presentation of the thesis research, followed by a short period of open questioning by the general public, moderated by your advisor. After questions from the general public, your advisor will dismiss the audience, upon which time the entire Committee will convene to hold an oral examination of the student’s thesis research. This will consist of several rounds of questions by the committee members, moderated by your advisor. Once the committee concludes with its questions, you will be excused from the room and your advisor and thesis

committee members will make a decision on the success or failure of the defense. A typical defense lasts around two hours in length.

A student passes the thesis defense if there is no more than one dissenting vote from the examining committee. Even with a passing vote, revisions and corrections can be expected. If unsuccessful, it is up to the advisor and committee to determine a proper course of action, beginning with the opportunity to revise, resubmit, and re-defend the thesis, or the portions considered by the Committee to be lacking. Your advisor will approve a final action plan. No student may re-defend a thesis more than once.

After the Defense

Thesis committee members will submit any additional written comments to you and/or your advisor within 48 hours of the oral defense. The primary advisor will work with the student to determine the necessary corrections and edits to be made prior to submission of the completed thesis document to the Thesis Reader. **The entire committee will digitally sign the signature page of the thesis** after a successful defense. Your advisor will complete and submit the Comprehensive Exam/Capstone Completion Form (see your Advisor to complete this via TopNet) to the Graduate School.

An electronic copy of the thesis final document and signed signature page must be submitted to the Graduate School (graduate.records@wku.edu) or (WAB 207).

Graduation!

Apply to graduate through Topnet and pay the graduation fee at the beginning of your **third semester**. Ensure that all of the appropriate paperwork and forms are on file (see checklist at http://www.wku.edu/graduate/students/degree_completion_checklist.php).

AFTER GRADUATION

You are now an alumna/us of the M.S. Geoscience program in the Department of Earth, Environmental & Atmospheric Sciences, Ogden College, Western Kentucky University. Faculty expect that you will begin a career in your chosen area of concentration or head off to a Ph.D. program. Whatever path you choose after graduation, stay in touch with your advisor and with the Department. Join the Alumni Association and become a regular contributor to the Department Alumni Foundation. The Department’s ability to provide financial support to the next generation of students for research, conferences, and other activities depends heavily on the generosity of its graduates. Plan on submitting an article or two from your thesis research to a professional journal – good science should be disseminated to a wider audience, and your thesis advisor will help you to prepare a manuscript for submission.

The Forms Cheat-Sheet

Form	Deadline	Completed?
DegreeWorks Program of Study	First semester (or prior to completing 12 hours of graduate credit)	
Committee and Topic Selection Form	Second semester (or upon successful defense of thesis proposal)	
Graduate Assistantship Renewal	Second semester (for funding in 2 nd year)	
Comprehensive Exam/Thesis Completion Form and Copyright Form	Final Semester prior to graduating	

Appendix I

Checklist for M.S. Geoscience thesis reviews

1. WKU FORMATTING - all WKU theses must follow the standard Graduate School formatting requirements – students should review the requirements at:

https://www.wku.edu/graduate/students/thesis/wku_thesis_guidelines.pdf

2. THESIS FORMATTING IN THE GEOSCIENCES - In addition to following the basic requirements detailed by the Graduate School, all Geoscience theses should follow established procedures for laying out the thesis – students are encouraged to review recently published theses in the geosciences, available online at: https://digitalcommons.wku.edu/geog_geol_theses/

For an example of a recent thesis, refer to: <https://digitalcommons.wku.edu/theses/2018/>

3. BODY OF THE THESIS - The format of the body of the thesis is standardized by WKU style requirements and departmental preferences. The number of chapters, chapter titles, headings, and subheadings within chapters should be chosen to present the material in a logical and comprehensible manner. The most important criterion is consistency of formatting throughout the thesis.

In the M.S. Geoscience program, all theses are original research-based. The thesis sections should include the following:

a. Preliminary material – Using roman numerals, the preliminary material includes the title page, signature page, acknowledgments, Table of Contents, List of Figures, List of Tables, List of Photographs (if referenced differently from figures), List of Appendices, and the abstract page. Refer to the WKU Graduate School style preferences.

b. Introduction – Start with regular numbering at this point. Within the introduction, the major headings should include the following: problem statement, significance, assumptions, and hypothesis to be tested or a clearly defined research statement. Avoid research statements that can be answered with a simple yes or no response. Use questions such as: “In what way...”; “How does this”; “Why does it appear”; “Where does this pattern”, “When did these changes....”, etc. The key here is to have a clear, unambiguous “SO WHAT” statement that gives the thesis intellectual credibility.

The problem statement should aim to contextualize the research issue at the macro, meso, and local scales, so that the research problem can be broadly understood and considered. For example, if conducting research on climate change, do not start out with a statement about local impacts on, e.g., agriculture. First, establish that climate change is a global phenomenon that requires analysis and understanding at a macro level, and then scale down from the regional to the local. Typically, citations are not included in the introduction, but they may be necessary if the introduction strays from the general context. Aim for a 2-3 page introduction.

c. Review of Literature – This section should position the thesis project within existing research frameworks. Make it clear what gaps exist in the literature that this research addresses. Cite research that is relevant to the thesis project – avoid citations that are tangential or not relevant.

Use the standard departmental format for in-text citations (Harvard or Parenthetical):

One author: (Jones, 2018) OR (Jones 2018) – a comma can be used or not – just be consistent throughout. If embedded in a sentence, the format is: “As Jones (2018) noted in her research.....” Citations are usually written in the past tense, as the research has already be concluded and published.

Two authors: (Smith and Jones, 2018) OR (Smith and Jones 2018) – use “and” rather than & throughout. If embedded in a sentence, the format is: “As Smith and Jones (2018) noted in their research.....” Citations are usually written in the past tense, as the research has already be concluded and published.

Three or more authors: (Darwin et al., 2018) OR (Darwin et al. 2018) – remember to spell out ALL the names of the authors in the references (e.g. Darwin, C., Da Vinci, L., Curie, M., 2018). If embedded in a sentence, the format is: “As Darwin et al. (2018) noted in their research.....” Citations are usually written in the past tense, as the research has already be concluded and published.

Government Agencies or Private Companies: Use acronyms in the text for citations of agencies and companies. For example: (FHA, 2018) or (FHA 2018). If embedded in a sentence, the format is: “As the FHA (2018) noted in its research.....” Note that singular government agencies and companies are “it” not “they” in the text. In the references, present the information thus: FHA (Federal Highway Administration), 2018. Highway Accident Data. Washington, D.C.: FHA. Available online at: <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>

Quotations in the text: Whenever you “quote a specific passage” from a cited work, you MUST provide the page number of the quoted material (e.g. Darwin 2018, 24).

DO NOT quote yourself if you are making a statement about something – you only quote yourself if you are referencing a publication of which you are the author.

VERIFY THE SOURCE: Students often “find” a source from scholar.google.com or other online source and cite/reference the source without verifying the original source. Check it out first **BEFORE** you cite it! Sometimes the source is simply a book review or other commentary that is not appropriate for a literature review. Due diligence in verifying sources is the responsibility of the student!

Academic Honesty and Plagiarism: Verify the accuracy of the citations and do not plagiarize material from any source – if you can find it on the web, then the thesis committee can find it too!!

d. Methodology – in this section, explain the methodology used in the research, why and how it's relevant, and what strengths or weaknesses exist in the methods selected.

e. Findings/Results: This is the meat of the thesis. Discuss what the research revealed, how or why the results support the hypothesis (or not) or validate the research statement, and highlight the strengths and weaknesses of the results.

f. Conclusion: In this final section, the aims of the research should be restated, the results should be summarized, and suggestions for future research should be given. Explain any shortcomings or weaknesses in the thesis, discuss what could be improved upon by the next researcher, and summarize what gap the research has filled in the literature on this topic (SO WHAT?).

g. References

The thesis must contain documentation for all sources cited. This documentation takes the form of the References pages. Each source that is cited in the narrative of the thesis must be documented in the References section.

h. Appendices: If any are needed, this is where they go.

4. GRAPHICS - General points

- Make sure you use uniform lettering and sizing of your original artwork.
- Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files. DO NOT embed titles of maps or graphics in the illustration or map – place this below the graphic as follows:

Figure 1. The Study Area. Source: Created by the author from a USGS (2017) base map. (Make sure you include the correct reference to the USGS (2017) citation in the reference list.)

Please do not:

- Use files that are optimized for only screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low. Use .tiff or .jpg files where appropriate.
- Include graphics that are too low in resolution to be viewed and understood clearly.
- Submit graphics that are disproportionately large or small for the content or page position. Use a landscape view in the text when appropriate.

Maps: Maps should follow standard cartographic formatting. In geography terms, this means that maps should have a scale, a North, a readable legend, an inset map (where appropriate) of the larger area for context, should be appropriately visually clean in nature, should convey the information clearly, and

should be properly attributed. Colors should be appropriate for visual inspection and should not bleed into each other in a way that obscures the important information.

Figure captions: Ensure that each illustration has a caption. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used. Note that Figure and Table captions should be identical to the short-form caption used in the List of Figures or List of Tables. The caption can be truncated in the List of Figures or List of Tables (only use the first few identical words of the caption to capture the relevance of the graphic or table). In other words, the entry in the List of Figures or List of Tables should not be longer than one line.

Tables: Tabular information should be inserted as editable text and not as images. Tables should be placed immediately following the paragraph in which the table is first mentioned. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Avoid using vertical rules and shading in table cells. The data in the table must be analyzed and discussed in the text, otherwise the table has no context or relevance.

5. GRAMMAR AND SYNTAX: The single biggest challenge for most writers is addressing grammar and syntax problems. Students must thoroughly edit the thesis before submitting it for review to the thesis committee. Use the WKU Writing Center or seek help from an expert editor in the department. Watch for all the usual problems in thesis writing (data are NOT data is; government agencies, companies, and countries are “it” rather than “they” (unless used in multiple) – for example, The United States is committed to addressing climate change and **it** has developed new policies for review. Mobil-Exxon has developed policies that position **it** at the leading edge of alternative energy infrastructure. **These data suggest** that melting is occurring at an accelerated rate (data are always plural unless you are referring to Data in Star Trek!).

Remember, edit, edit, edit, edit continuously!

Appendix II Helpful website links to survive grad school

General WKU Links:

WKU Portal: my.wku.edu

WKU Toppermail: link on portal or <http://www.wku.edu/it/webmail/>

TopNet: link on portal or topnet.wku.edu

WKU Website: <http://www.wku.edu/> (take note of the great little search box in the upper right corner – it will search within WKU websites)

Geoscience Program Links:

EEAS Website: <https://www.wku.edu/eeas/graduateprogram.php>

M.S. Geoscience Grad Student Handbook: <https://www.wku.edu/eeas/documents/eeas-graduatehandbook-ay22v2sm.pdf>

WKU Grad School Links:

WKU Grad School: <http://www.wku.edu/graduate/> (take note of the menu for current students)

Grad School Forms and Documents: <https://www.wku.edu/graduate/documents/index.php>

Traveling ... if so, you may need these links:

Employee Travel Authorization Form:

<https://intranet.wku.edu/php/prod/wkuforms/source/WKUFormsCreateInst.php?form=TravelAuth>

OCSE Student Travel Funding Application:

http://wku.edu/ogden/documents/travel_funding_application_student.pdf

Grad School Travel Grant Application:

http://www.wku.edu/graduate/documents/aid/grants/travel_application.pdf

(There is also a Word Document Travel Grant Budget Form that goes along with this - both of these forms can be found on the Grad School Forms link in the section above).

Planning to work next summer? You will need a FAFSA on file:

FAFSA: <https://fafsa.ed.gov/> (if you plan on working in summer, will need to do one of these for student employment) – International students do not need this.

Need funding for Research? Some helpful links:

Grad School Research Grant Application

http://www.wku.edu/graduate/documents/aid/grants/research_grant_application_form_012116.pdf

(There is also a Research Grant Budget form that goes along with this and can be found on the Grad School Forms and Document link above)

Handbook Revision History:

Version 4 – Approved by the Graduate Faculty on August 18, 2014

Version 5 – Revised to recognize changes in program course structure: August, 2015

Version 6 – Revised to clarify Reader expectations, changes in program course structure, summer 2016

Version 7 – Revised for minor program corrections and edits to language, summer 2017

Version 8 – Revised for minor program corrections, edits to language, changes to policies and forms, summer 2018

Version 9 – Revised for minor program corrections, edits to language, changes to policies and forms, updated Department name, summer 2020

Version 10 – Revised for minor program corrections, edits to language, changes to policies and forms, summer 2022