

**HANDBOOK FOR THE MASTER OF SCIENCE DEGREE IN GEOINFORMATICS**

GRADUATE CATALOG 2017-19

DEPARTMENT OF GEOLOGICAL SCIENCES

UNIVERSITY OF TEXAS AT SAN ANTONIO

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## I. INTRODUCTION

The Graduate Handbook for the Master of Geoinformatics degree is a guide to policies, requirements, and procedures that govern graduate study hosted in the Department of Geological Sciences (DGS). The DGS interfaces with the UTSA Graduate School, which publishes “Master’s Degree Regulations” (<http://utsa.edu/gcat/chapter4/MastersDegReg.html>), an important document with which you should be familiar. The Graduate School encourages departments of The University to build graduate programs that are sufficiently rigid to assure uniformly high standards and yet flexible enough to provide the best possible education for individual students. This handbook supplements the material set forth in the Graduate Catalog. Petitions for exceptions to the requirements may be submitted in writing to the Graduate Advisor of Record (GAR) for the graduate program for consideration by the Graduate Studies Committee.

## II. GRADUATE STUDY

Graduate study involves far more than meeting a series of regulations and deadlines, the last of which is recognized by the award of the degree. Attaining specific goals at appropriate times is an important element in the development of a skilled and productive scientist, but it does not define the educational process of seeking an advanced degree. Graduate study requires the development of a disciplined, questioning mind and by pursuing a graduate degree, there is the opportunity to cultivate intellectual abilities to develop the foundation, independence, intellectual curiosity, and self-discipline necessary for productive scholarship.

The education of a scholar involves transition. It begins with the building of a firm foundation and proceeds to a stage in which knowledge is extended through research. This transition occurs as the scholar develops and does not result simply from the passage of time. It should begin early in the scholar's career and be marked by a change from accepting to questioning scholarly authority. It is marked by a change from a dependent to an independent approach to education. The change requires the individual to develop and extend intellectual curiosity. The degree to which one possesses and exercises intellectual curiosity determines in large part one's ultimate success as a scholar.

## III. DEGREE REQUIREMENTS FROM GRADUATE CATALOG

### A. COURSEWORK REQUIREMENTS

The Masters of Geoinformatics degree can be earned in two years through a thesis or non-thesis option, which have specific coursework requirements. The thesis option is for students who wish to engage in a research experience of significant scope and develop expertise in research techniques and data analysis through conducting an independent research project. The thesis option is recommended for students who plan a career in research or anticipate pursuing a doctoral degree. The non-thesis option is best for those who want to earn the degree primarily through organized coursework. The research experience embedded in this option is of a more limited scope compared to that associated with a thesis project. It is possible to switch from a thesis to a non-thesis option or vice versa. However, any switch needs to be done early in the degree program, preferably in the second or early third semester, to meet the completion guidelines. Each student devises a program of study in consultation with their supervisor and

other graduate committee members based on the option selected but keep in mind that the Graduate Advisor of Record must approve this program of study.

**1. Coursework for Thesis option** (32 credit hours in total)

Required courses: 17 credit hours

One of the following:

[CE 5293](#) Geographic Information Systems (GIS)  
or [GEO 5033](#) Geographical Information Systems (GIS)

All of the following:

[GEO 5053](#) Remote Sensing  
[GEO 5063](#) Applied Statistics for Geoinformatics  
[GEO 6011](#) Seminar in Geospatial Science and Applications (take twice)  
[GEO 6513](#) Advanced GIS  
[GEO 6533](#) Programming for Geospatial Application

Elective coursework: 9 credit hours and Master's Thesis: 6 credit hours.

**2. Coursework for Non-Thesis option** (32 credit hours in total)

Required courses: 20 credit hours

One of the following:

[CE 5293](#) Geographic Information Systems (GIS)  
or [GEO 5033](#) Geographical Information Systems

All of the following:

[GEO 5053](#) Remote Sensing  
[GEO 5063](#) Applied Statistics for Geoinformatics  
[GEO 6011](#) Seminar in Geospatial Science and Applications  
[GEO 6513](#) Advanced GIS  
[GEO 6533](#) Programming for Geospatial Application  
[GEO 6953](#) Independent Study

Elective coursework: 12 credit hours

**B. PROPOSAL FOR THESIS RESEARCH**

A research proposal is a plan for carrying out a specific research project. For the thesis option, this proposal will be developed in consultation with the supervising faculty member as well as other members of the supervisory committee. Prior to the collection of observations for a thesis project, the student must develop and defend a plan for carrying out the thesis research. The written proposal is circulated to members of the supervisory committee and then subsequently defended in front of them, starting with a 20-minute oral presentation that outlines key points of the research and its plan.

The document content must cover seven key components as follows:

1. Background knowledge that critically summarizes what is known about a scientific problem and identifies gaps in knowledge.
2. A problem statement that articulates the knowledge gap that the research will address plus research questions or aims and hypotheses that will be tested.
3. The significance of the research topic in the subfield and/or discipline
4. A detailed methodology outlining the strategy for data collection and analysis and formal testing of hypotheses
5. Preliminary results if any
6. Expected results and how they are anticipated to contribute to the advancement of the science or application to societal needs.
7. Timeline for completing the research.
8. References cited

### **C. EXAMINATION**

Students must pass a comprehensive exam as part of the degree requirements. If it is not passed the first time, a second attempt can occur in a subsequent semester when enrolled as a student.

#### **1. Comprehensive Exam for Thesis Option**

The defense of the thesis document constitutes the comprehensive exam for the thesis option. This is an oral exam taken in front of the supervisory committee after the thesis document has been circulated to the committee. See section VII.B for details.

#### **2. Comprehensive Exam for Non-Thesis Option**

For the non-thesis option, the comprehensive exam is a written exam that covers several major areas of Geoinformatics. These major areas are typically defined by the courses taken from the members of the supervisory committee. This examination can be taken after at least 20 credit hours of coursework have been completed.

## **IV. PROGRAM REQUIREMENTS**

### **A. RESEARCH SEMINARS**

As part of university life, scholars and scientists visit the campus to give research seminars. Attend as many of these as possible to expand your knowledge base and to meet people in your field of interest. GEO 6011 Seminar in Geospatial Science and Applications is required for two semesters but you should attend research presentations even when not enrolled in the course while at UTSA. Also look for notices of other research talks of interest that are posted on the UTSA website and around campus.

### **B. CONFERENCE PRESENTATION**

The presentation of research results at professional scientific meetings is a vital and rewarding part of professional development and scientific engagement. Giving a research presentation at the College of Sciences Research Conference is required of all graduate students in the program. This conference is held on campus every fall semester (early October). Students are also encouraged to present at regional or national meetings put on by professional organizations.

## C. PUBLICATION OF THESIS RESEARCH

An important part of scientific engagement is sharing the results of a research project by publishing them in peer-reviewed journals or other venues, such as conference proceedings. All thesis students are highly encouraged to develop their results for possible publication. In doing so, students should work closely with their Supervisor but should also involve other Graduate Committee members who have made a significant contribution to the thesis project when developing manuscripts for possible publication.

## V. ADVISING AND SUPERVISION

Each student is responsible for fulfilling all degree requirements but faculty provide advice and help. The Graduate Advisor of Record (GAR) provides initial advising about courses and other program matters until a supervisory professor is identified. All new students must meet with the Graduate Advisor to discuss their program of study prior to registering for classes. The Graduate Advisor runs the student orientation, which all new students are required to attend at the beginning of their first semester.

### A. SUPERVISOR

Each admitted student is assigned a faculty supervisor based on common research interests. Students should set up regular meeting times with their supervisor to discuss their program of study and research project each semester. These meetings serve as an important opportunity for intellectual development as well as form an apprenticeship for learning how to conduct independent research.

Change in research direction by the student is typically the only reason why a change occurs in this supervisor-student relationship. In such cases, students need to discuss this change in direction with the faculty member. Failure to make progress on thesis research may lead a faculty supervisor to recommend the student complete the degree by the non-thesis option. In all cases, the Graduate Advisor is available for advice and mediation if change is requested.

### B. SUPERVISORY COMMITTEE

All students are required to form a graduate committee comprised of three faculty members. The committee provides input on and must approve the student's program of study, is tasked with examining the student in relation to degree requirements (e.g., research proposal examination, comprehensive examination), and provides advice and constructive criticism on thesis projects where relevant. The supervisor is the chair of this committee and must be a tenured or tenure track faculty member at UTSA (Table 1). It is possible for chair duties to be shared between two faculty members as co-chairs. Non tenure-track faculty can co-chair a thesis or non-thesis committee.

All committee members must be members of the Graduate Faculty at UTSA. If a desired member is not part of the Graduate Faculty, a petition can be filed with the University Graduate Council to add the person to the Graduate Faculty but there is no guarantee that it will be approved. The student must seek approval for their committee from the Graduate Advisor by filing the *Supervisory Committee* form. Any subsequent changes to committee composition must be fully communicated to the student and faculty and approved by the Graduate Advisor by filing an updated form.

For students pursuing the thesis option, the supervisor should be an expert in the topical area of the thesis project. Committee members should have a similar or complementary expertise that would make their involvement advantageous based on the thesis project. For students pursuing the non-thesis option, the supervisor should be an expert in a key area of Geoinformatics for degree examination. At least one course should be taken from the supervisor. Other committee members should be those from which a course has been taken to provide other major areas for the examination. For both options, no more than one member can be a non-tenure-track faculty member or be from another institution.

<i>Faculty group</i>	<i>Name</i>
Graduate Studies Committee	Nazgol Bagheri
	Yongli Gao
	Alberto Mestas-Nunez
	Hatim Sharif
	Corey Spark
	Hongjie Xie
Other Core Faculty	Sonia Alconini, Steve Ackley, Janis Bush, Darrell Carpenter, Victor De Oliveira, Marcio Giacomoni, Matthew Gibson, Alex Godet, Judy Haschenburger, Jaime Hincapie, Jeffrey Hutchinson, Azza Kamal, Myung Ko, Lance Lambert, Max Kilger, Marina Suarez, Newfel Mazari, Jeff Prevost, Firat Testik, Blake Weissling, and Keying Ye.

<sup>a</sup> Current as of Fall 2018

## VI. THESIS RESEARCH

### A. SCOPE AND EXPECTATIONS

The thesis research should make a contribution to the discipline and in this way generates new observations, ideas, and/or models. Any research, therefore, must be set into the current knowledge from the scientific literature to ensure a contribution and have a specific research aim. In the earth system sciences, most research is hypothesis driven so there needs to be articulated research questions and hypotheses that will be tested using empirical data. Results that are derived are focused on addressing the research questions and must be explained and



related back to the current state of knowledge on the topic in the discussion of the results. A good thesis also addresses the significance of the work and how it contributes to advancing understanding of the subfield and/or broader discipline of geoscience.

The thesis project should start in the first semester in the program. This is important for staying on track to complete the degree in two years (full-time students). The two-year time line is more likely to be met if one writes as they go, instead of waiting until the last semester to write all the text. Following the time line in table 2 will help the entire research endeavor stay on track.

<b>Table 2. Timeline of research tasks and writing to complete thesis research*</b>		
Complete by:	Research Task	Thesis Writing
First semester - fall	Develop thesis topic and initial background knowledge, research aim, and methods	Draft sections of topic introduction, background knowledge, and problem statement
Second semester - spring	Finalize background knowledge, research questions, hypotheses and methods	Draft section of methods
Third semester - summer	Finalize methods and collect observations in field, lab or modeling; start related lab analysis or calculations	Update methods as data collected
Fourth semester - fall	Process data/observations and finish lab or data analysis	Draft section of results Finalize introductory and methods sections
Fifth semester - spring		Draft sections of results interpretation and conclusions; Finalize entire document and defend

\*assumes fall semester start to program

## **B. PROCEDURES FOR THESIS DEFENSE AND FINAL SUBMISSION**

The thesis must be first approved by the thesis advisor before distributed to the rest of the supervisory committee for comments. Committee members must receive the thesis at least two weeks before a scheduled defense. The thesis defense will take from 1 to 2 hours to complete. It starts with a 20-25 minute oral presentation that summarizes the key points from each of the thesis chapters. The presentation is followed by a question and answer period. The defense is opened to any interested parties, who are given the opportunity to ask questions first. This is followed by a closed session when committee members ask questions of the candidate for the degree.

The format and submission of the thesis document must follow Graduate School requirements. See <https://graduateschool.utsa.edu/current-students/formatting-requirements/>

## VII. GENERAL STEPS AND TIMELINE FOR DEGREE COMPLETION

All full-time graduate students are expected to finish their degree requirements in two years. A part-time student will take longer but should not be more than six years. Table 3 outlines the general steps and timeline that all full-time students should follow.

<i>Item</i>	<i>Thesis option</i>	<i>Non-thesis option</i>
Leveling and conditional courses	Finish before taking graduate courses <sup>^</sup>	
Decide on thesis or non-thesis option	First semester*	
Meet with assigned supervisor	Prior to or at beginning of first semester	
Develop preliminary program of study	First semester	
Develop thesis topic	First semester	
Identify committee members	End of second semester	Second or third semester
Defend thesis proposal to obtain feedback from committee	End of second semester	
Take directed research course		Third semester
Take comprehensive exam	Fourth semester	Fourth semester

<sup>^</sup>An exception can be made when prescribed undergraduate courses are not offered every semester but this requires approval by the Graduate Advisor.

\*Semester means spring or fall semester, not summer

## VIII. MAXIMIZING THE GRADUATE EXPERIENCE

As a graduate student one transitions to greater engagement with the subject matter and the overall endeavor of conducting science and contributing to the generation of new knowledge. This engagement can be achieved in various ways outlined below. Making the most of the graduate experience means taking advantage of all opportunities afforded.

### A. ACTIVITIES

#### 1. Learning from peers

Volunteer to help your graduate student peers with aspects of their research projects, such as fieldwork, lab analysis, or calculations. In addition to learning more technical skills and gaining additional experience, if you are a thesis student, you will also gain help with your project in exchange.

#### 2. Membership in professional organizations

Joining a professional organization as a student often has great benefits, such as access to travel funds to support conference attendance, job postings, and/or competitive student research grant

programs. Students should consult with their supervisor about professional organizations and meetings that are relevant to their research and career trajectory. Attending conferences, meetings, and workshop is a great way to network, which may facilitate employment after graduation.

### **3. Applying for Research Grants**

Students pursuing the thesis option are encouraged to work with their supervisors to gain valuable experience writing research grant proposals to help fund their projects. Writing proposals that outline a specific project or work task is a typical part of most geoinformatics-related careers, including private consulting, public agencies, and academics. Honing these skills in graduate school will therefore have significant job-related benefits. See section X.C.II.

## **B. RESOURCES**

### **1. Graduate Student Professional Development Center:**

<https://graduateschool.utsa.edu/current-students/category/graduate-student-professional-development-center/>

### **2. Department of Geological Sciences website: <http://www.utsa.edu/geosci/index.html>**

## **IX. UNIVERSITY-WIDE POLICIES**

### **A. ENROLLMENT REQUIREMENTS**

A full-time student must take at least 9 hours per fall or spring semester. Full-time enrollment during the summer semester is 5 credit hours for domestic students and 6 credit hours for international graduate students. International graduate students must be full time to maintain F-1 visa status (see <http://international.utsa.edu/current-students/enrollment/>). Summer enrollment for international students is optional as long as they are eligible and intend to register for the following fall semester. However, summer enrollment is required if the student is a teaching or research assistant.

### **B. ACADEMIC STANDING**

Good academic standing requires a minimum GPA of 3.0. Student are placed on academic probation if:

- 1) The GPA is below 3.0 in any semester at UTSA. The GPA is based on all courses taken so includes graduate and undergraduate levels.
- 2) A grade of D+, D, or D- is earned in any course in a semester.
- 3) On reinstatement to the university following an academic dismissal.

### **C. ACADEMIC DISMISSAL**

A student who meets any of the following conditions is placed on the academic dismissal list:

- 1) Admission conditions are not met.
- 2) A grade of F is earned in any course.

- 3) The GPA is below 2.0 in any semester.
- 4) Conditions leading to academic probation occur in the semester following placement on academic probation.
- 5) Failure to pass an oral or written exam (such as Comprehensive Examination) required for the degree after the maximum of two attempts.

If dismissed from the university, a petition application for reinstatement can be filed after one long semester.

## X. FINANCIAL SUPPORT

### A. ASSISTANTSHIPS

Financial support is available as teaching and/or research assistantships in the Department or other units in The University. Applicants for research assistantships should directly talk to individual faculty members who have grants to support graduate students for research.

Applications for teaching assistantships should be directed to the Chair of the Department as well as Laurie Gay in the Departmental Office. Teaching assistantships vary in number from year to year, so that initial award of an assistantship does not assure the recipient of continuous support during residence. The Department has been successful, however, in providing continuous support to students who perform satisfactorily. If the work of a graduate teaching assistant is unsatisfactory or if the student is placed on academic probation, the Department may suspend the appointment. Department policy is that student can be supported as full-time teaching assistantships for a maximum of four semesters.

As required by the University, graduate students **must** meet the following academic eligibility requirements to hold a research or teaching assistantship.

1. Admitted as "degree-seeking" into a graduate program. Any student admitted to the university with conditions is not eligible.
2. Enrolled in a minimum of 6 credit hours during a long semester (Fall and Spring) and 1 credit hour during a Summer semester.
3. Maintain a minimum GPA of 3.0 so in good academic standing (see section X.B above).

### B. SCHOLARSHIPS

Several Departmental Scholarships are also available on a competitive basis and can be found using the link <http://www.utsa.edu/geosci/scholarships.html>. Some of these scholarships can qualify students to pay in-state tuition and fees, if not otherwise qualified for in-state status.

## C. ADDITIONAL SOURCES OF FINANCIAL ASSISTANCE

### 1. Travel to Professional Conferences

There are several sources of funds to support travel to conferences to present research results. First, students can apply for partial support for travel expenses to give a paper at regional, national, or international conferences from the Department once a year. The number and amount of travel awards depend on the availability of funds.

Second, the Graduate School also supports presentations at regional, national, or international conferences. See <https://graduateschool.utsa.edu/current-students/presenting-at-academic-conferences/>

Third, some professional organizations also operate a program to fund student travel when presenting research results. Applicants may need to be members of the organization to be eligible. Some known opportunities are listed below but search other individual webpages of professional organizations.

a) American Geophysical Union: <https://education.agu.org/grants/student-travel-grants-application-requirements/>

b) American Society of Photogrammetry and Remote Sensing: <https://www.asprs.org/awards-and-scholarships/student-assistantships.html>

### 2. Research expenses

Students are strongly encouraged to submit proposals for research grants to professional organizations and federal agencies such as NSF, NASA, and NOAA.

## XI. UNIVERSITY AND DEPARTMENTAL DEGREE FORMS

University and departmental forms may be needed at different times during the degree program, related to degree plans (Program of study, Course add/drop), independent learning (Independent study, Directed research), official university travel (Student travel authorization), and employment at the university (Pre-application for student employment, Pre-application teaching assistant, Employee time sheet), and other financial support (Request financial support). Links to these forms can be found at <http://www.utsa.edu/geosci/resources.html>. For reference, the most commonly used follow.

### University-level forms

- a) Program of study
- b) Independent study
- c) Supervisory committee

### Department-level forms

- d) Directed research

e) Pre-application teaching assistantship

<b>Table 3. Degree program paperwork</b>		
<i>Item</i>	<i>Content Preparation</i>	<i>Form preparation and submission</i>
Program of study form	Established by student in consultation with research advisor and Graduate Advisor of Record	Preliminary form completed by student; Finalized form submitted by departmental office prior to graduation semester
Supervisory committee form	Established by student in consultation with research advisor	Student notifies department office of committee membership; Form submitted by departmental office
Independent study form (if applicable)	Established by student in consultation with professor supervising course	Student responsible for obtaining approval signatures and submission
Directed research form (if applicable)	Established by student in consultation with professor supervising course	Student responsible for obtaining approval signatures and submission
Graduate credit for upper-division undergraduate course	Established by student in consultation with research supervisor and instructor of undergraduate course, including specific syllabus	Student responsible for form and obtaining approval signatures
Applying for graduation	Established by student via ASAP; Student responsible for notifying departmental office if graduation semester changes	Associated paperwork submitted by departmental office
Pre-application teaching assistantship	Established by student	Student responsible for submission to Laurie Gay and Chair of the department