Department of Geological Sciences

The Department of Geological Sciences offers a Master of Science Degree in Geology, Master of Science Degree in Geoinformatics and a Certificate of Professional Development in Geographic Information Science. Department faculty also participate in the Ph.D. program in Environmental Science and Engineering administered by the Department of Civil and Environmental Engineering.

- M.S. in Geology (p. 2)
- M.S. in Geoinformatics (p. 2)

Master of Science Degree in Geology

The Master of Science degree program in Geology offers opportunities for advanced study and research designed to prepare students for roles in industry, government, research institutes, or educational institutions.

Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed an undergraduate degree in geology (equivalent to UTSA's) or a bachelor's degree in chemistry, physics, mathematics, computer science, life sciences, or engineering from an accredited institution of higher education with sufficient coursework in the geosciences. Students whose undergraduate preparation is deficient but who meet the minimum University standards for admission may be conditionally admitted and required to complete specific courses as conditions of admission. If such courses are listed as deficiencies, they will not count toward the graduate degree. Applicant’s evaluations will be considered on a case-by-case basis.

Applicants must submit three letters of recommendation from persons familiar with the applicant’s academic record, a personal statement of research interest, undergraduate transcripts, and scores from the Graduate Record Examination (GRE). When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. All supporting documents must be sent to the Graduate School. Incomplete applications will not be considered until all required items are in an applicant’s file.

Applicants whose native language is not English must submit scores from the Test of English as Foreign language (TOEFL) or the International English Language Testing Systems (IELTS) and must meet the minimum University-wide requirements.

The graduate faculty and Graduate Advisor of Record (GAR) will be responsible for recommending acceptance into the program and will take the lead in advising students before an academic advisor is identified. A limited number of teaching assistantships are available and applications should be submitted to the Graduate Advisor of Record. Individual faculty members may have opportunities for research assistantships and should be contacted directly.

Graduate Committee

As specified by University regulations, candidates for the Master of Science degree must have a Graduate Committee. The Committee will be chaired by the student’s academic advisor and will consist of a minimum of two other members. Each student must decide if they are going to complete the thesis or non-thesis option in the first year if not done so in the first semester because that will determine the type of committee appointed. The Committee should be appointed once an academic advisor and topic have been determined. University rules for the supervising committee must be followed. Only tenured or tenure-track faculty members can chair these committees, and no more than one member can be a nontenure-track faculty member or be from another institution.

Comprehensive Examination

Candidates for the Master of Science degree must pass a comprehensive examination administered by their Graduate Committee. The student should normally schedule this examination the semester before the degree requirements are to be completed. The student’s Graduate Committee will determine the content of the examination. Normally, the examination will consist of academic material that the student is expected to have mastered during his or her course of study. For a thesis option student, the thesis defense is treated as the comprehensive examination. The examination may only be taken twice. If it is not passed the first time, it may be scheduled again in the following semester.

Thesis Option in Geology

Degree Requirements

The Master of Science degree in Geology requires the successful completion of a minimum of 33 semester credit hours (exclusive of coursework or other study required to remove academic or admission deficiencies).

Thesis Option Requirements

All candidates for the Master of Science in Geology with thesis option must complete a minimum of 33 semester credit hours of the following:

A. 5 semester credit hours of required courses:
   - GEO 5103  Current Topics in the Geosciences
   - GEO 5991  Graduate Seminar in Geology (repeated for a total of 2 hours)

B. A minimum of 22 semester credit hours of electives in consultation with Graduate Advisor of Record:
   - A minimum of 22 hours of graduate credit in organized classes with the approval of the Graduate Advisor of Record is required.
   - This may include no more than 6 hours total of any combination of GEO 6953 Independent Study and GEO 5973 Directed Research. Under special circumstances, students may take up to 6 semester credit hours of upper-division undergraduate coursework in the College of Sciences or College of Engineering with approval of the Graduate Advisor of Record.

C. Master’s Thesis:
   - GEO 6983  Master’s Thesis (repeated for a total of 6 hours)
   - Candidates must submit a research proposal to the student’s Academic Advisor and Committee no later than the beginning of the third semester of graduate work.

D. Comprehensive Examination:
Candidates for the Master of Science degree electing the thesis option must also pass a final oral comprehensive examination in which they successfully defend their thesis before their Graduate Committee. The thesis defense will take two to three hours to complete. The thesis defense is normally scheduled in the last semester before the degree requirements are to be completed. Part of the thesis defense will be a public presentation in an open, advertised forum.

### Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed either a bachelor of science degree, with emphases in geological, biological, physical, environmental, or computational sciences, or a bachelor of arts degree, with emphases in geography, social sciences, humanities, or business. Five required background classes or equivalents are: algebra (MAT 1073), computer programming (CS 1063), physics (PHY 1603 or PHY 1943), statistics (STA 1053), and world geography (GES 1023). Students whose undergraduate preparation is deficient but who meet the minimum University standards for admission may be conditionally admitted and required to complete specific courses as conditions of admission. If such courses are listed as deficiencies, they will not count toward the graduate degree. Background with GIS and/or remote sensing courses is a plus, but not required. Applicant's evaluations will be considered on a case-by-case basis.

Applicant must submit two letters of recommendation from persons familiar with the applicant's academic record, a personal statement of research or career interest, undergraduate transcripts, Graduate Record Examination (GRE) scores. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. All supporting documents should be sent to the Graduate School. Incomplete applications will not be considered until all required items are in an applicant’s file.

Applicants whose native language is not English must submit scores from the Test of English as Foreign Language (TOEFL) or the International English Language Testing Systems (IELTS) and must meet the minimum University-wide requirements.

Geoinformatics Graduate Studies Committee comprised of five graduate faculty members elected from the involved departments and colleges, and Graduate Advisor of Record (GAR) will be responsible for recommending acceptance into the program. A limited number of teaching assistantships are available and application should be submitted to the Department Chair. Individual faculty members may have opportunities for research assistantships or research fellowships and should be contacted directly.

### Graduate Committee

As specified by University regulations, candidates for the Master of Science degree must have a Graduate Committee. The Committee will be chaired by the student’s graduate advisor and will consist of a minimum of two other members. Each student must decide if they are going to complete the thesis or nonthesis option in the first year if not done so in the first semester because that will determine the type of committee appointed. The Committee should be appointed once an academic advisor and topic have been determined. University rules for the supervising committee must be followed. Only tenured or tenure-track faculty members can chair these committees, and no more than one
member can be a nontenure-track faculty member or be from another institution.

**Comprehensive Examination**

Candidates for the Master of Science Degree must pass a comprehensive examination administered by their Graduate Committee. The student should normally schedule this examination the semester before the degree requirements are to be completed. The student’s Graduate Committee will determine the content of the examination. Normally, the examination will consist of academic material that the student is expected to have mastered during his or her course of study. For a thesis option student, the thesis defense is treated as the comprehensive examination. The examination may only be taken twice. If it is not passed the first time, it may be scheduled again in the following semester.

**Thesis Option in Geoinformatics**

**Degree Requirements**

The Master of Science degree in Geoinformatics requires the successful completion of a minimum of 32 semester credit hours (exclusive of coursework or other study required to remove academic or admission deficiencies).

**Thesis Option Requirements**

All candidates for the Master of Science in Geoinformatics with thesis option must complete a minimum of 32 semester hours of the following:

A. 17 semester credit hours of required courses: 17

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
  (Repeated for a total of 2 semester credit hours)
- GEO 6513 Advanced GIS
- GEO 6533 Programming for Geospatial Application

B. A minimum of 9 semester credit hours of electives in consultation with Graduate Advisor of Record:

An additional 9 semester credit hours of graduate credit as approved by the Graduate Advisor of Record is required, which includes a minimum of two prescribed courses in a candidate’s substantive area of interest from the following:

- ANT 6653 Spatial Techniques in Anthropology
- CE 5303 Hydro meteorology
- CS 5443 Database Management Systems
- CS 5633 Analysis of Algorithms
- DEM 7093 GIS for Population Science
- DEM 7263 Spat ial Demography
- ES 5023 Environmental Statistics
- GEO 5083 Remote Sensing Image Processing and Analysis
- GEO 5093 Remote Sensing in Hydrology
- GRG 5913 Design and Management of Geographic Information Systems
- IS 5003 Introduction to Information Systems

Total Credit Hours: 32

**Nonthesis Option in Geoinformatics**

**Degree Requirements**

The Master of Science degree in Geoinformatics requires the successful completion of a minimum of 32 semester credit hours (exclusive of coursework or other study required to remove academic or admission deficiencies).

**Nonthesis Option Requirements**

The nonthesis option is available for those who want the opportunity to earn the Master of Science degree in Geoinformatics primarily through organized coursework. Nonthesis students should consult the Graduate Advisor of Record on their program of study during the first semester of residence. For the independent study course, candidate must work on a project that applies geospatial technology to the candidate’s area of specialty and must write a final project report and present to the candidate’s Graduate Committee as the final oral comprehensive examination. This is normally scheduled in the last semester before the degree requirements are to be completed.

Candidates are required to complete a minimum of 32 semester credit hours of the following:

A. 20 semester credit hours of required courses: 20

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
  (Repeated for a total of 2 semester credit hours)
- GEO 6513 Advanced GIS
- GEO 6533 Programming for Geospatial Application
- GEO 6953 Independent Study

B. A minimum of 12 semester credit hours of electives in consultation with Graduate Advisor of Record:
An additional 12 hours of graduate credit as approved by the Graduate Advisor of Record is required, which includes a minimum of two prescribed courses in a candidate’s substantive area of interest from the following:

- ANT 6653 Spatial Techniques in Anthropology
- CE 5303 Hydrometeorology
- CS 5443 Database Management Systems
- CS 5633 Analysis of Algorithms
- DEM 7093 GIS for Population Science
- DEM 7263 Spatial Demography
- ES 5023 Environmental Statistics
- GEO 5083 Remote Sensing Image Processing and Analysis
- GEO 5093 Remote Sensing in Hydrology
- GRG 5913 Design and Management of Geographic Information Systems
- IS 5003 Introduction to Information Systems
- IS 5143 Information Technology
- IS 6703 Introduction to Data Mining
- STA 5103 Applied Statistics
- STA 6863 Spatial Statistics
- STA 6973 Special Problems
- URP 5233 GIS for Urban Studies

and other courses if course descriptions are appropriate.

Certificate of Professional Development in Geographic Information Science

The purpose of the Professional Certificate in Geographic Information Science is to train individuals from a broad range of academic disciplines to be competent users of Geographic Information Science and the related tools of Remote Sensing and GIS programming. Although the program is generally oriented toward geological sciences professionals, individuals with business, social science, medical, engineering, computer science, criminal science or education backgrounds will benefit from this professional certificate. Individuals completing this certificate will gain a practical and hands-on knowledge of Geospatial Science. All courses taken in the Professional Certificate in Geographic Information Science program may be applied toward a Master’s degree in Geology or Environmental Science, a Doctoral degree in Environmental Science and Engineering, or other graduate degree with approval of the Graduate Advisor of Record of the degree program.

Description of Certificate Program

The Certificate in Geographic Information Science is a 15-hour program. Degree-seeking, special graduate or non-degree-seeking students from any discipline at UTSA are allowed to complete the Certificate in Geographic Information Science program. Candidates for the certificate should ideally complete the program within one year, but not more than two years. Students will receive program guidance from the GIS Certificate Advisor.

Certificate Curriculum

To complete the certificate program, students are to take the following four graduate courses addressing Geographic Information Science, and a fifth course, chosen in consultation with and approved by the student’s GIS Certificate Advisor, which will serve as a “capstone” course in which the student will apply at an advanced level what has been learned in the other four required courses. The fifth course may be any course with a strong component of GIS application, including independent study, in the student’s area of specialty.

A. 9 hours of required courses:
- GEO 5053 Remote Sensing
- GEO 6513 Advanced GIS
- GEO 6533 Programming for Geospatial Application (Programming for Geospatial Application)

B. 3 hours selected from one of the following:
- ANT 6653 Spatial Techniques in Anthropology
- CE 5293 Geographic Information Systems (GIS)
- DEM 7093 GIS for Population Science
- GEO 5033 Geographical Information Systems
- GRG 5913 Design and Management of Geographic Information Systems

C. Capstone course chosen in consultation with and approved by the student’s GIS Certificate Advisor

Total Credit Hours

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