New Program Request Form for Bachelor's and Master's Degrees

Administrative Information

1. <u>Institution</u>: The University of Texas at San Antonio

2. <u>Program Name</u> – Show how the program would appear on the Coordinating Board's program inventory (*e.g., Bachelor of Business Administration degree with a major in Accounting*): Master of Science in Geoinformatics

3. <u>Proposed CIP Code</u>: 40.0699.02

4. <u>Number of Required Semester Credit Hours (SCHs)</u> (*If the number of SCHs exceeds 120 for a Bachelor's program, the institution must request a waiver documenting the compelling academic reason for requiring more SCHs*): 35 for thesis option and 32 for non-thesis option.

5. <u>Brief Program Description</u> – Describe the program and the educational objectives:

Understanding and use of geospatial information and development of spatially integrated methods are needed to address issues related to environmental, biological, physical, and social processes. The Interdisciplinary Graduate Program in Geoinformatics aims to provide students with an educational experience and research opportunities that address both fundamental and applied issues in the application of geospatial information and technology to the understanding of social, natural, and virtual environments. The benefits of Geoinformatics education and research extend across the geoscience, environmental, biological, urban planning, social, health, and behavioral sciences, as well as civil and environmental engineering because the spatial dimensions of natural and built environments plus social interactions are of paramount importance for understanding classic questions about the natural world and the human condition.

The Master's program is for (1) applicants with Bachelor of Science degrees that emphasize geology, biological, physical, environmental, or computational sciences who wish to pursue education/research in areas of Geology, Spatial Modeling of the Environment, Environmental Science, Geocomputation, Remote Sensing, Climate Change, Renewable Energy, Urban Planning, and Visual Analytics, or (2) applicants with Bachelor of Arts degrees that emphasize social sciences or humanities to pursue education/research in areas of Historical Geographic Information Science (GIS), Public Participation in GIS, Archaeology, Ecological Anthropology, Critical GIS, Public Health, Demography or spatial science and human rights.

6. <u>Administrative Unit</u> – Identify where the program would fit within the organizational structure of the university (*e.g., The Department of Electrical Engineering within the College of Engineering*): Department of Geological Sciences within the College of Sciences

7. <u>Proposed Implementation Date</u> – Report the date that students would enter the program (MM/DD/YY): Fall 2016

8. <u>Contact Person</u> – Provide contact information for the person who can answer specific questions about the program:

   Name: Dr. DeBrenna Agbenyiga

   Title: Dean of Graduate School

   E-mail: debrenna.agbenyiga@utsa.edu

   Phone: 210-458-6878

Program Information

I. Need

Note: Complete I.A and I.B only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

A. <u>Job Market Need</u> – Provide short- and long-term evidence of the need for graduates in the job market.

In response to the High Growth Job Training Initiative, the US Department of Labor declared geospatial technology as one of 12 targeted industries which are high growth, high demand, and economically vital for the nation. Career opportunities span academia, government, industry, and non-governmental organizations. Lending itself to both physical and social sciences, geospatial technology is applied across a broad range of sectors. Areas of application include information technology, land and resource management, public health and safety, marketing and business intelligence, planning and landscape architecture, transportation and logistics, energy and utilities, asset management, redistricting (e.g., school districts, congressional districts, or municipalities), consumer industries (e.g., in-car navigation systems, location-based services, realty acquisition), and many others.

Geospatial infrastructure and standards are central to the e-government initiatives in the US, UK, Canada and many other countries worldwide. Sophisticated geoinformatics capabilities are important for a broad spectrum of homeland security activities, government planning for

emergency preparedness and the everyday business of federal agencies. State and local governments use GIS extensively for tax assessment, transportation planning and maintenance, environmental management, and economic development. GIS is the backbone of MapQuest and Google Maps, which are commonly used by a wide range of industries and the general public for location information and routing.

Despite the current economic challenges, GIS job markets have been holding steady with over 2500 positions open monthly throughout the second quarter of 2008 and a median salary of about $56,000 nationwide. GIS industry reportedly grew in the double digits in 2010 and another 8% in 2011. Analysts forecast the global GIS markets will grow 8-10% from 2014-2018. Job openings for GIS and Remote Sensing scientists, technicians, and technologists are projected to grow between 3% and 9% between 2010 and 2020, while median salaries for these positions continue to rise. Some GIS jobs require only basic training in data acquisition and data entry that have been mostly filled by student interns or technicians with certificates. The proposed program will provide students with critical geospatial and computational thinking skills so that they can be competitive for positions as analysts, scientists, and project managers.

San Antonio is a metropolitan area that has many military, government, industry, and academic institutions with a large demand for geospatial analysts or specialists. For example, due to the recent boom of Eagle Ford Shale Gas/Oil exploration, many companies need GIS specialists for map making, spatial data collection, and database maintenance of oil/gas drills, pipelines, and environmental impacts. As a military city, the Department of Defense issued contracts to the sum of $5.5 billion in 2006. Nine thousand additional students have been projected to result from such spending alone. Of particular note to geospatial technology with respect to military funding is the rapid increase in national security and terrorism funding. Many of the graduate students or GIS certificate students educated at UTSA secure internship opportunities while in school and land jobs right after graduation.

B.   Student Demand – Provide short- and long-term evidence of demand for the program.

The graduate GIS certificate program has operated for over 10 years in the Geological Sciences Department. Students from all over the UTSA campus seek the certificate. However, in many cases they are not admitted or they must take leveling classes because they have backgrounds in the social sciences or humanities and do not meet prerequisites in physics and math that are required for the Remote Sensing class, one of five GIS certificate classes. One way to solve this problem is to remove the remote sensing class from the five required certificate courses, making it one of a set of prescribed electives. At the same time, it is an opportune time to develop a Master's degree in this field, which can better serve students who need not only the GIS but also remote sensing, global positioning system, and spatial statistic skills to meet their career goals. All necessary classes for such a degree have been taught in the Department of Geological Sciences with other elective classes based in several other departments on campus.

Although there is large job demand from the government, transportation, natural resources, military/law enforcement, utilities, and communication and Telecom sectors in San Antonio and South Texas region, there are no GIS or Geoinformatics graduate programs in the region. If approved, UTSA's geoinformatics program will be the first in the region to provide high quality graduates to meet employer needs. Particularly, many Hispanics students will take advantage of the

program and the opportunity for career advancement and green jobs close to home. When graduate programs are locally available, students from family with low incomes, particularly Hispanics and first generation, will attend at higher rates than Anglos (Jones and Kauffman, Social Science Journal, 1994). This program will serve a large number of Hispanics and other ethnic groups in San Antonio who seek a higher degree but cannot commute to San Marcos (the closest GIS graduate program) given their full time employment and/or family obligations.   The majority of graduate courses at UTSA are evening courses, which will meet the needs of these full-time workers.

C.   Enrollment Projections – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (*Include majors only and consider attrition and graduation.*)

YEAR	1	2	3	4	5
Headcount	10	15	20	25	30
FTSE	8	10	15	22	25

II.   Quality

A. Degree Requirements – Use this table to show the degree requirements of the program. *(Modify the table as needed; if necessary, replicate the table for more than one option.)*

This new program is a multidisciplinary program with faculty and students across the campus. In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed either an Bachelor of Science degree, with majors in geology, geography, biological, physical, environmental, or computational sciences, or an Bachelor of Arts degrees, with majors in social sciences, humanities, or business. Four required background classes or equivalents are: Algebra (MAT1073), Physics (PHY1603 or 1943), Statistics (STA1053), and Computer Programming (CS1073). Applicants lacking these requirements will be asked to complete the deficiencies early in their program. Backgrounds with GIS and/or remote sensing courses are a plus but not required. Applicant's evaluations will be considered on a case-by-case basis.

The degree requires the successful completion of a minimum 35 semester credits hours for the thesis path or 32 hours for the nonthesis path. Free elective courses can be taken from any college and should be approved by the student's graduate committee or the Graduate Advisor of Record. The 3 hours more for the thesis option is due to a requirement for thesis students to take the "Thesis" course twice, while for nonthesis option students, the "Independent study" course is only required once.

Category	Semester Credit Hours	Clock Hours
General Education Core Curriculum (bachelor's degree only)		

4

Required Courses	23 for thesis path 20 for non-thesis path	
Prescribed Electives	6	
Free Electives	6	
Other (Specify, e.g., internships, clinical work)		
TOTAL	35 for thesis path 32 for non-thesis path	

B. Curriculum – Use these tables to identify the required courses and prescribed electives of the program. Note with an asterisk (*) courses that would be added if the program is approved. (Add and delete rows as needed. If applicable, replicate the tables for different tracks/options.)

Prefix and Number	Required Courses	SCH
GEO5033 or CE5293	Geographic Information Sciences Geographic Information Systems	3
GEO5053	Remote sensing	3
*GEO5xxx	Applied Statistics for Geoinformatics	3
GEO6513	Advanced GIS	3
GEO6533	Programming for Geospatial Applications	3
GEO6011	Seminar in Geospatial Science and Applications	1 x 2
GEO6983 or GEO6953	Thesis Or Independent study/project	3 x 2 Or 3

(*The Applied Statistics for Geoinformatics (Geo5xxx) will be a new course to be developed; Seminar GEO6011 is required to be taken twice; GEO6983 is required to be taken twice for thesis option; GEO6953 is for nonthesis option.)

Prefix and Number	Prescribed Elective Courses	SCH
ANT6653	Spatial technologies in anthropology	3
CS5443	Database management systems	3
CS5633	Analysis of Algorithms	3
DEM7093	GIS for population science	3
DEM7263	Spatial Demography	3
ES5023	Environmental Statistics	3
GEO5083	Remote sensing image processing and analysis	3
GEO5093	Remote Sensing in Hydrology	3
GEO6523	GIS for Water Resources	3
GEOG5913	Design and Management of GIS	3
IS5003	Introduction to information systems	3
IS5143	Information Technology	3
IS6703	Introduction to data mining	3
STA5093	Introduction to statistical inference	3
STA5103	Applied statistics	3
STA6863	Spatial statistics	3
URP5363	Urban Planning Methods I	3

(A minimum of 6 credit hours of prescribed elective courses)

C. <u>Faculty</u> – Use these tables to provide information about <u>Core</u> and <u>Support</u> faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. *(Add and delete rows as needed.)*

Name of <u>Core</u> Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program
e.g.: Robertson, David Asst. Professor	PhD. in Molecular Genetics Univ. of Texas at Dallas	MG200, MG285 MG824 (Lab Only)	50%
Alconini, Sonia Assoc Professor (Anthropology)	Ph.D. in Anthropology-Archaeology. University of Pittsburgh	ANT6653	10%
Bush, Janis, Assoc Professor (Environmental Science)	PhD in Environmental Science Univ. of Texas El Paso	ES5023	10%
Bagheri, Nazgol Asst Professor (Geography)	PhD in Geography Univ. of Missouri-Kansas City	GRG5913	10%
Carpenter, Darrell Asst Professor (Information Systems)	PhD in Business Administration Univ. of Texas San Antonio	IS5003, 5143	10%
De Oliveira, Victor Assoc Professor (Statistics)	PhD in Statistics Univ. of Maryland	STA6863	5%
Gao, Yongli Assoc Professor (Geological Sciences)	PhD in Hydrogeology Univ. of Minnesota	GEO5033, 6513	10%
Gibson, Matthew Asst Professor (Computer Science)	PhD in Computer Science University of Iowa	CS5633	5%
Ko, Myung Assoc Professor (Information Systems)	PhD in Business Administration Virginia Commonwealth Univ.	IS6703	5%
Mazari, Newfel Lecturer (Geological Sciences)	Ph.D. in Envir. Sci. & Eng. Univ. of Texas at San Antonio	GEO5033, 6533	10%
Rudnicki, Ryan Senior Lecturer (Geological Sciences)	Ph.D. in Geography Pennsylvania State Univ.	GEO5033	10%
Sharif, Hatim Assoc Professor (Civil Engineering)	PhD in Environmental Univ. of Connecticut	CE5293	10%
Sparks, Corey Assist Professor (Demography)	Ph.D. in Anthropology and Demography. Pennsylvania State Univ.	DEM7093, DEM7263	10%
Walter, Rebecca Assist Professor (Urban Planning)	Ph.D. in Geosciences Florida Atlantic Univ.	URP5363, 5393	10%
Weissling, Blake Senior Lecturer (Geological Sciences)	Ph.D. in Envir. Sci. & Eng. Univ. of Texas at San Antonio	GEO5053, 5083, 5093, 6523	10%

*Xie, Hongjie Assoc Professor (Geological Sciences)	PhD. in Geological Sciences Univ. of Texas El Paso	GEO5033, 5053, 5083, 5093, 6011, 6513	20%
Ye, Keying Professor (Statisitcs)	PhD. in Statistics Purdue Univ.	STA5093, 5103	10%
Zhang, Wenning Assoc Professor (Computer Science)	PhD. In Computer Science University of Illinois at Chicago	CS5443	5%
New faculty in Year 2016 or 2017	PhD in Geospatial Science	TBD	15%

(*Xie will be the Graduate Advisor of Record for the program for the first 3-5 years.)

Name of Support Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program
Dutton, Alan Assoc Professor	PhD in Hydrology Univ of Texas at Austin	GEO5603	10%
Godet, Alex Asst Professor	PhD in Geology Université de Neuchâtel	GEO5504	10%
Haschenburger, Judy Assoc Professor	PhD in Geography Univ of British Columbia	GEO6534	10%
Lambert, Lance Professor	Ph.D. in Geology Univ. of Iowa	GEO5904	10%
Suarez, Marina Asst Professor	Ph.D. in Geology University of Kansas	GEO6304	10%
Young, David Asst Professor	Ph.D. in Geology Univ. of California at Santa Barbara	GEO5894	10%

D. Library – Provide the library director's assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program. (Provided by Posie Aagaard, Associate Dean of UTSA Libraries, on Dec 2, 2014)

The University of Texas at San Antonio Libraries serve the campus community through locations at the Main Campus, Downtown Campus, and the Institute of Texan Cultures at the Hemisfair Park Campus. The Libraries provide students and faculty with seamless and comprehensive access to information as well as spaces for active learning, teaching, and interdisciplinary scholarship. Over the past several years, the Libraries and the University have taken sustained, targeted action to improve library collections, facilities, and services to support an aspiring Tier One institution.

Collections

Overview
The Libraries provide access to over 3.6 million print and online monographic volumes, nearly 500 online databases, over 87,000 serials, 50,000 audiovisual items, tens of thousands of streaming videos, 3.5 million photographs, and 2.3 million microforms (including primary research materials). The large government documents collection includes a complete depository for Texas state documents and a selective Federal Document Depository.

The Libraries' Faculty Liaison program promotes direct communication between the Subject Specialist Librarian and a faculty representative to facilitate faculty input into materials selection, ensuring that Library acquisitions support the university's academic programs and research foci and that the collections' strengths are enhanced and any weaknesses are remedied. It is assumed that the Faculty Liaison for Geological Sciences would continue to work with the Subject Specialist Librarian in selecting materials necessary and appropriate for a Geoinformatics master's program.

Library Materials and Expenditures in Geology, Geography, GIS, remote sensing and Related Areas
Existing library collections in geological sciences and related areas form a solid foundation for supporting the proposed cross-disciplinary program. The Libraries provide access to major geology, geography, GIS, remote sensing and related natural sciences e-resources which include thousands of e-journals in support of UTSA's curricular and research emphases, as well as thousands of related ebooks and over 100 major online databases; major print and online journals; and over 64,000 print books in these combined areas. The Libraries also provide access to materials in related areas, such as demography, environmental science, water resources, civil engineering, urban planning, physics, computer science, statistics, and mathematics.

In FY2014, the Libraries expended over $50,000 for books, databases, multimedia, and journals in direct support of Geological Sciences programs and an additional $762,305 in related disciplines. Approximately $42,000, or about 85% of the total amount spent on materials for Geological Sciences, was expended on databases and journals. The remaining amount was expended on print and electronic books and multimedia materials.

Assessment of Collection Strengths and Growth

Research Databases
The Libraries provide access to databases with content crucial to undergraduate and graduate studies and advanced research across all areas of geological sciences, geography, GIS, and other related areas with content published by major societies and providers, such as *GeoREF,* publications of the *Geological Society of America, ACM Digital Library, ASCE Library, Engineering Village,* and *IEEE Xplore;* major publishers' collections of ejournals, ebooks, conference proceedings, and technical reports in *ScienceDirect, SpringerLINK,* and *Wiley Online Library;* and other relevant scholarly and specialized content. Digitized government technical reports are available through the Center for Research Libraries' (CRL) *Technical Report Archive & Image Library (TRAIL).* The Libraries' membership in CRL also provides access to the extensive Linda Hall Library archives of engineering, science, and technology materials. These databases collectively ensure research-level access to fundamental materials needed to support a master's program in Geoinformatics.

The Libraries offer access to databases in related fields that provide additional support for geoinformatics, such as *Digital Sanborn Maps (Texas and National), Geological Society of London's Lyell Collection, Institution of Civil Engineers' Virtual Library, LandScan, Referex Engineering, OECD iLibrary,* and *SimplyMap.* Related content specific to environmental science and water resources is available in *AGU (American Geophysical Union) Journals, Environmental Abstracts, Environmental Sciences & Pollution Management,* and *Water Resources Abstracts.*

Ejournals
Nearly fifty ejournals specific to geoinformatics, GIS, GPS, remote sensing, spatial statistics, data analytics, photogrammetry, geoscience, geospatial technology, and general informatics are available in publishers' collections such as *Cambridge, Emerald, JSTOR, Oxford, Sage, SpringerLINK, ScienceDirect, Taylor & Francis,* and *Wiley Online Library,* as well as more specialized databases such as *ACM Digital*

Library. In addition, the Libraries provide access to over 700 journals specific to civil and environmental engineering, as well as thousands more in other engineering subdisciplines and related disciplines.

Several online journal collections are paid using general Libraries collection funds or funds from other disciplines, rather than funds earmarked for the purchase of geological sciences materials, including *Academic Search Complete* and *ProQuest Research Library*. These online aggregators expand support to scholarship at UTSA and to the proposed master's degree in Geoinformatics.

Books and Ebooks
The Libraries have a strong collection of monographs, including conference proceedings and standards, specifically purchased to support science programs. Print collections in geological sciences, geography, GIS, remote sensing and related areas exceed 64,000 titles, and ebooks number close to 30,000. Thousands of new ebooks in areas related to geoinformatics periodically become available in databases such as *SpringerLink, ScienceDirect, Oxford, Synthesis Digital Library, ENGnetBASE, IEEE Xplore,* and *Wiley Online Library.* Thousands more related ebooks are available in *Ebook Library* and *Safari Books Online.*

Access to Specialized GIS Software and Data
Through the campus-wide license to ESRI products, the Libraries provide access to *ArcGIS Desktop* on every public computer, with access to ESRI's data and web applications. Multiple open-access governmental, state, and nonprofit data sources are featured in the Libraries' GIS research guide online.

Additional Research-Level Materials
The Libraries provide access to other online resources, such as *Annual Reviews, Dissertations & Theses Full Text, Sage Research Methods, Journal Citation Reports (JCR),* and *Web of Science,* that support upper-level studies and intensive research activities for a number of existing and proposed academic programs.

Resources Available through Library Partners
The Libraries participate in a variety of cooperative library agreements at the local, regional, national, and international levels that serve to broaden the base of resources available to the UTSA's faculty, students, and staff and significantly improve access to resources. Some resources are made available through the **UT System Advisory Committee on Library Resources**, which cooperatively acquires, houses, and provides access to additional resources that may be beyond the means of any single UT institution. Membership in the **Center for Research Libraries** provides the UTSA community access to over 5 million unique, rarely held materials collected by the Center. These materials both supplement and complement the holdings of most major research libraries. The **TexShare Library Resource Sharing Program** supports and enhances resource sharing among Texas academic libraries. In addition to access to all available online catalogs of TexShare libraries, TexShare membership entitles participants access to several major databases. Membership in the **Council of Research and Academic Libraries (CORAL)** authorizes UTSA users to access other member institutions' collections at no charge. This access includes unique archives and collections in the San Antonio area that may provide special opportunities for graduate-level research.

Summary of Collections
The Libraries work closely with UTSA faculty in Geological Sciences and other departments in the College of Sciences to provide access to collections relevant to faculty and students' educational and research needs. Review of the proposed program's curricular needs and other universities' Geoinformatics programs' resources shows that the Libraries' collections are sufficiently broad and deep to support undergraduate and graduate level research in geoinformatics. The collections can continue to grow in areas of focus as needed. The Libraries' additional methods for providing access to specialized materials ensure that UTSA's students and faculty have the access they need to fully support upper-level academic

programs and extensive research activities. As with its support of other existing undergraduate and graduate-level science degrees at UTSA, the Libraries are well positioned to provide targeted services and access to materials for the proposed master's degree in Geoinformatics.

The Libraries' facilities, services, information resources, and personnel provide broad support for graduate-level research and learning at an aspiring Tier One institution.

Locations. The Libraries have four locations to serve graduate students at their point of need. Located on the Main Campus, the John Peace Library (JPL) is the largest library and is open 24 hours-a-day, five days-a-week during the fall and spring semesters, as well as extended weekend hours. The Downtown Library serves academic programs at UTSA's Downtown Campus. The Applied Engineering and Technology Library on the Main Campus—the nation's first bookless library on a college or university campus--provides study and collaborative spaces for graduate science and engineering students. Reading rooms on JPL's fourth floor and at the Institute for Texan Cultures house special collections including the university's own archives and rare books, personal papers, and other unique historical items documenting the people, history, life, and literature of San Antonio and South Texas.

Spaces and Services for Student Success. With over 2,780 seats and 405 computers, the Libraries offer a variety work and study spaces. Areas include an Information Commons for computing, collaboration, and research; GroupSpot, a state-of-the-art digital classroom and study space that facilitates collaboration through small group tables with shared displays; quiet study and computing areas; and 60 group study rooms, including some dedicated for graduate student use. The Assembly Room, located on JPL's 4th floor, provides a 120-seat venue intended for major academic events drawing audiences from across the university and local community.

The Libraries offer a number of additional services and resources to enhance student success, including self-service group study rooms, laptops and multimedia equipment for borrowing, online course reserves, textbook reserves, high-speed scanners, DVD viewing stations, and collaborative group workstations. Graduate students may keep borrowed books and some multimedia items until the end of the semester. The Libraries' reference services have moved far beyond the traditional reference desk. Students and researchers are encouraged to "Ask us Anything" via the Libraries' popular online chat reference system, or by text, email, phone or in-person at one of our information desks. Subject specialist librarians provide individualized in-depth research consultations with graduate students. The Libraries actively participate in campus outreach activities for graduate students.

The Libraries offer graduate students a variety of skill-building workshops on advanced library research and bibliographic management tools, amongst other topics. To support graduate students who serve as teaching assistants, the Libraries provide specialized TA training.

Access to Materials. The Libraries house and provide access to a wide variety of materials (described more fully in the Collections section above) through a single search box (Library QuickSearch), hundreds of online databases, and other tools. Students and faculty may access online databases from off campus. The Libraries provide seamless access to materials through the *Get It For Me* (InterLibrary Loan) service, providing direct, convenient delivery of books and articles, whether owned by the library or not. Specialized subject and course research guides are available at http://libguides.utsa.edu.

Library Personnel. The Libraries employ 51 professional staff, including 29 librarians and archivists with accredited graduate degrees, as well as 65 full-time support staff and 19 graduate research assistants and student assistants. The professional assigned as geological sciences subject specialist librarian works with faculty liaisons in the College of Sciences to provide program support for research and teaching.

E. <u>Facilities and Equipment</u> – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

The department currently has two GIS and remote sensing teaching labs (one with 30 **workstations**, the other with 12 **workstations**) and a remote sensing and geoinformatics research lab that has a data server with 20 TB storage for handling GIS and remote sensing data and data processing, a full-range spectroradiometer and other instruments (see table below), and a 12 seat graduate student research office. We currently have a University-wide ESRI GIS licenses for unlimited users on campus and off campus for registered UTSA students. We have a mix of GPS receivers and data-loggers, although they are old.

We have 25 licenses of ENVI/IDL image processing software package in a floating license pool, and a 5 seat license pool of Erdas IMAGINE image processing software. They are all available to the entire campus and should be expanded to 50 licenses of ENVI/IDL, to meet the new graduate program.

Additional processing cores and expanded backup storage space for the 20 TB cluster would be needed.

Hardware and software currently available for the new Geoinformatics program

Item	Quantity
Spectroradiometer (ASD FR)	1
GPS Base station: Trimble 4600 LS	2
GPS Mapping Receivers: Trimble Pro XRS	1
GPS Mapping Receivers: Trimble Pro XRS w/Terrasync	2
GPS Mapping Receivers: Trimble GeoExplorer III	13
GPS Mapping Receivers: Trimble GeoExplorer II	6
Garmin 12 GPS Receivers	10
Garmin Etrex GPS Receivers w/WAAS	12
Trimble Precision Agriculture System	1
Advantage Laser Rangefinder for GPS	1
Rain gauges (tipping bucket)	8
Data and image server (20 TB)	1
Printers	4
Plotter	1
Scanner	2
Computers and workstations in LRSG	38
Computers and workstations in Spatial Analysis Lab	25
ESRI GIS (ArcView, ArcGIS, ArcIMS, ArcSDE)	site licen.
ENVI/IDL	25
FLAASH	3
Airborne lidar data processing software	1
Ecognition	1
Erdas Imagine	5
MATLAB	10
Electromagnetic induction (EM31)	2

Multi-frequency electromagnetic induction	1
Snow radar	1
Terrestrial lidar system	1
Thermal infrared camera	1
Ground penetrating radar	1
Automated camera system for sea ice	3

F.　Accreditation – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

The proposed science graduate program has no national-level accrediting body. Similar to all the graduate programs within the College of Sciences, the MS in Geoinformatics will be accredited by the Southern Association of Colleges and Schools.

III.　Costs and Funding

Five-Year Costs and Funding Sources - Use this table to show five-year costs and sources of funding for the program.

The Department of Geological Sciences (DGS) staff will handle administrative duties. The plan is to hire one tenure-track faculty member to help support both the GIS certificate program and the new Geoinformatics graduate program. This new hire could be one of the Departmental new hires to increase the departmental faculty size to ~ 15 in the next 5-10 years. Therefore, there is no additional faculty cost to the proposed new program.

The DGS has the needed GIS software as a university-wide license, which is under the OIT's annual maintenance. The DGS has two types of remote sensing software (one 5 licenses, and one 25 licenses) and both are under the Departmental annual maintenance. The DGS needs to upgrade the 25 licenses to 50 licenses (university-wide) with an initial cost of about $10,000 and annual software contractual maintenance of $5,000. (10 + 5x5 = $35k).

The DGS has 42 computers for teaching and for students working on lab homework, which need to be updated in the next 5 years. This cost is about $70,000. Additionally, there is a need for 25 new GPS units at a cost of $5000 and expanded backup storage space for the 20 TB cluster at a cost $5,000.

Five-Year Costs		Five-Year Funding	
Personnel[1]	$	Reallocated Funds	$0
Facilities and Equipment	$115,000	Anticipated New Formula Funding[3]	$699,535.2
Library, Supplies, and Materials	$0	Special Item Funding	$0
Other[2]	$0	Other[4]	$0
Total Costs	**$115,000**	**Total Funding**	**$699,535.2**

1. Report costs for new faculty hires, graduate assistants, and technical support personnel. For new faculty, prorate individual salaries as a percentage of the time assigned to the program. If existing faculty will contribute to program, include costs necessary to maintain existing programs (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).
2. Specify other costs here (e.g., administrative costs, travel).

3. Indicate formula funding for students new to the institution because of the program; formula funding should be included only for years three through five of the program and should reflect enrollment projections for years three through five.
4. Report other sources of funding here. In-hand grants, "likely" future grants, and designated tuition and fees can be included.

Formula funding: (20+25+30) (years 3-5 Headcount)*32 (total hours)*0.7 (portion of hours in GEO)*416.39(MS formula weights) = $699,535.2

Signature Page

1. <u>Adequacy of Funding</u> – The chief executive officer shall sign the following statement:

    I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.

    _____   _____
    Chief Executive Officer   Date

2. <u>Board of Regents or Designee Approval</u> – A member of the Board of Regents or designee shall sign the following statement:

    On behalf of the Board of Regents, I approve the program.

    _____   _____
    Board of Regents (Designee)   Date of Approval

3. <u>Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval</u> – For a program to be approved by the Commissioner or the Assistant Commissioner for Academic Affairs and Research, the Board of Regents or designee must certify that the new program meets the eight criteria under TAC Section 5.50 (b):   The criteria stipulate that the program shall:

    (1) be within the institution's current Table of Programs;
    (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
    (3) have sufficient clinical or in-service sites, if applicable, to support the program;
    (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
    (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
    (6) not unnecessarily duplicate existing programs at other institutions;
    (7) not be dependent on future Special Item funding
    (8) have new five-year costs that would not exceed $2 million.

    On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).

    _____   _____
    Board of Regents (Designee)   Date