

New Program Request Form for Bachelor and Master's Degrees

Directions: An institution shall use this form to propose a new bachelor's or master's degree program. In completing the form, the institution should refer to the document *Standards for Bachelor's and Master's Programs*, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. Note: An institution which does not have preliminary authority for the proposed program shall submit a separate request for preliminary authority. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

Information: Contact the Division of Academic Affairs and Research at 512/427-6200 for more information.

Administrative Information

1. Institution: Sam Houston State University
2. Program Name – Master of Science in Geographic Information Systems
3. Proposed CIP Code: 45.0701
4. Brief Program Description – The proposed, online Applied GIS program is targeted toward individuals seeking professional employment in the geospatial technology career field, especially as it pertains to the use of Geographic Information Systems (GIS). The proposed program will provide students with the knowledge required to work in this high-demand field. The program would require the completion of a minimum of 36 hours of credit and would consist of nine 3-hour courses, two seminar courses (2-hours credit and 1-hour credit, respectively) and six hours of thesis if the thesis option is chosen. A student wishing to complete a thesis must take six hours of electives at the 400-level or 500-level as part of the 27-hour block. (See Table 1 for the list of courses.) Students who do not wish to complete a thesis also must take six hours of electives at the 400-level or 500-level, as well as six additional hours of graduate coursework in lieu of the six thesis hours. The non-thesis option reflects an entirely applied focus that is geared toward enhancing career-related skills. Also, this option allows students to take additional courses in either the geography program or other relevant programs on campus to enhance their expertise in a desired area of emphasis. All of the optional courses have in common the use of information technology, spatial concepts and/or the use of geospatial technology and/or software. All are currently offered by programs at SHSU. (See Table 2, for the list of elective courses). If potential students are lacking GIS coursework or experience, they will be required to take one or two of the 400-level GIS courses as stem work to provide the fundamental background needed for those seeking entry into the program. This coursework will not count toward the degree. Specifically, students could take Introduction to GIS (GEO 444) and Applied GIS (GEO 435) to meet the minimum entry-level GIS requirement.

The “applied” component of this program is in contrast to theoretical approaches in the discipline that focus on the development of software and mathematical algorithms for processing and analyzing data. Therefore, the purpose of this program is to enable graduates to use geospatial software and related technology to analyze and solve real-world problems in a variety of fields ranging from criminal investigation, to business development, emergency services, urban planning, military applications, environmental analyses, and other areas. Potential uses of applied GIS are vast, which means that there will be a strong demand for individuals with these skills into the foreseeable future.

5. Administrative Unit – Department of Geography and Geology – Geography program
6. Proposed Implementation Date – Fall 2009, or as soon as possible following THCB approval.
7. Contact Person – Provide contact information for the person who can answer specific questions about the program:

Name: Dr. Marcus Gillespie

Title: Associate Professor of Geography

E-mail: marcusg@shsu.edu

Phone: 936-294-1233

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. Job Market Need

Geospatial technology is one of the fastest growing applied technology fields in both business and government, with the projected demand for individuals trained in GIS far exceeding the supply. The geospatial technology field includes GIS, GPS (Global Positioning System), remote sensing, oil and gas exploration, computer programming, and computer cartography – all of which would be components of the proposed degree. As reported in an article in the Career and Recruitment section of the prestigious journal Nature (Gewin, 2004), geospatial technology, nanotechnology, and biotechnology are the top three technology fields in the United States. Furthermore, the article in Nature stated that 26% of NASA’s most highly trained geotechnology staff will retire in the next decade and that the National Geospatial Intelligence Agency is expected to need 7,000 people trained in GIS. This governmental

demand reflects both the general growth in demand for enhanced GIS capabilities, as well as America's focus on Homeland Security (Gewin, 2004).

According to ESRI (Environmental Systems Research Institute, Inc.), which is the world's leading provider of Geospatial Software, the number of professionals using GIS as a part of their job in the United States is approaching 500,000, with a similar number of GIS users in the rest of the world. An estimated 50,000 are working with GIS on a full-time basis and these numbers are growing at about 15 percent per year. Given these figures, the job market demand for people with GIS training is about 75,000 per year. Most of these people will be using GIS as a part of their job. "The demand for graduates with intensive GIS education, obtained either through certificate programs or advanced degrees, is very large and **there is a great demand for people who hold master's degrees in GIS. The shortfall of individuals with advanced degrees in GIS in the United States is estimated at 3,000 to 4,000 graduates per year.** The demand overseas is even greater due to the lack of appropriate programs in many parts of the world. Worldwide, approximately 3,100 colleges and universities are involved in some way with GIS, with 1,400 of those institutions located in the United States. Though the number of institutions appears large, most of these schools are offering only one course in GIS" (<http://www.esri.com/news/arcuser/0700/umbrella11.html>, accessed 1/29/08).

Other sources support the overview of the field provided by ESRI. For example, the Geospatial Information Technologies Association (GITA), which is an important source of information on the current and future status of the GIS industry, reports that the job growth rate in the GIS field since the year 2000 was approximately **30% per year** (Schutzberg, 2005). Clearly, this qualifies GIS as one of the fastest-growing fields in both the U.S. and international job markets. And, in a speech made in 2004 by the Assistant Secretary of Labor for the Employment and Training Administration, Emily Stover DeRocco, stated that the geospatial technology field, "has a current worldwide market of about \$5 billion, and is growing by 10 to 13% per year, a growth rate that is expected to continue throughout this decade." She also stated that, "A survey of geospatial product and service providers revealed that **87% of respondents said they had difficulty filling positions requiring geospatial technology skills**" (http://www.directionsmag.com/columns.php?column_id=71, accessed 1/26/2008).

According to GIS Stuff: A Blog About GIS (http://gisstuff.blogspot.com/2006_07_01_archive.html, 7/10/2006, accessed 1/26/2008) the GIS/Geospatial Market Grew 17% in 2005 to \$3.3 billion. This "blog" is published by Daratech, Inc, which identifies itself as a leading provider of information regarding technology market research and technology assessment. In 2006, CNN and Money Magazine's annual list of "Best Jobs in America" included GIS-related professions among the 166 jobs surveyed. Among the professions listed were "Cartographers and Photogrammetrists which had a 10-year job growth rate of over 15%" (<http://www.imagin.org/resources/enews/IMAGINENews200605.htm>, accessed 1/26/08). Cartography and remote sensing are both components of the geospatial technology field and courses in both cartography and remote sensing are taught by the Department of Geography and Geology.

More recent data indicates that, in 2007, the number of technology related jobs, which includes GIS, grew by 8% and totaled approximately 300,000 jobs (<http://geojobs.blogspot.com/2008/01/us-tech-employment-up-by-8-in-07-thats.html>, accessed 1/26/2008). The strong demand for GIS specialists is also indicated by the number of jobs listed on various job posting services on the internet. One of these sites, Indeed.com, (<http://www.indeed.com/>, accessed 12/20/2007), listed 6,137 jobs related to geospatial technology. The GIS Jobs Clearinghouse (<http://www.gjc.org/>, accessed 12/20/2007), which claims to be the

“most visited GIS/Remote Sensing job site on the internet,” listed 268 jobs for the two-month period from October 23, 2007 through December 20, 2007. Of these 268 job listings, 29 were in Texas (i.e., 10.8%). Examples of job titles included GIS Analyst, GIS Technician, Transportation Planner/Analyst II-GIS Specialist, GIS Developer, Assistant State Cartographer, GIS/IMS/Server Applications Developer, Associate GIS Technician, GIS Database Administrator, GIS Team Leader, GIS Database/Systems Coordinator, GIS/Mapping Technician, among others. A few of these listings included academic positions. In fact, a very large percentage of job listings for academic positions in geography require knowledge of GIS.

Other data strongly support the conclusion that there is a strong demand for individuals with higher-level training in GIS. In an article published in the Association of American Geographers Newsletter (Vol. 35, No. 6, 2000), Michael Phoenix, ESRI Manager of University Relations, said that, “As the GIS industry matures, the depth and breadth of GIS education will increase and organizations will demand more of their GIS practitioners—such as knowledge of geospatial statistics and greater analytical skills.” According to Mr. Phoenix, “Graduate programs provide students with the advanced skills and critical thinking needed to take GIS-based analysis to the “next level”. This is because individuals that have a degree in the GIS field should be far more efficient, more capable of utilizing the technology, and hence, more competitive. Furthermore, such individuals will have a greater understanding of geographic principles, data limitations, and research methodologies. This enables them to be more than technicians that merely manipulate data overlays. Such individuals can pose hypotheses, solve problems, and interpret data; i.e., they can become problem solvers and decision-makers. Undoubtedly, those individuals with a masters degree will earn more than those with a bachelors.

The actual salaries for GIS specialists will vary geographically, but those in the Houston area are quite good. According to the web source Indeed: One Search All Jobs (<http://www.indeed.com/salary?q1=GIS+Analyst&1=Houston%2C+Texas>, accessed 11-10-2007), the average salaries for GIS-related jobs in the Houston area are as follows:

Associate GIS Developer - \$65,000
Senior GIS Analyst - \$76,000
GIS Analyst - \$49,000
GIS Database Analyst - \$46,000
GIS Programmer Analyst - \$62,000
Geographic Information Systems Analyst - \$59,000
Geospatial Analyst - \$51,000
GIS Programmer - \$65,000
GIS Developer - \$69,000

With such a large demand for professionals with GIS training and good salaries for those in the GIS field, as well as the rapid growth in the demand anticipated in the foreseeable future, one can only conclude that there is a substantial market for individuals with a graduate degree in GIS. The proposed program would help fill this unmet demand. Furthermore, **none of the universities in the Houston area offer a Masters degree in GIS**. Indeed, offerings of advanced GIS-related courses are limited throughout the State of Texas. Given Sam Houston State University's proximity to the Houston metropolitan area, the program would definitely fill a niche market for which there would be a strong demand. Finally, the department has a state-of-the-art GIS lab and a separate remote sensing/computer cartography

lab, including a designated server that would provide all of the technological resources needed for the proposed degree.

Admission Criteria

Students seeking admission to the graduate program in the Applied GIS Program must submit the Graduate Studies Application for Admission with the one-time application fee to the Office of Graduate Studies, official transcripts of all college-level work (including the transcript that shows the date the undergraduate degree was conferred), and official GRE scores. Two letters of recommendation from the faculty members at the student's undergraduate degree-granting institution are required with the application for admission. A 3.0 overall undergraduate GPA is recommended for admission into the program. For a final admissions decision, GRE scores do not constitute the sole criterion for consideration of the applicant, nor do GRE scores and undergraduate GPA constitute the primary criteria to end consideration of an applicant. Based on review of a student's undergraduate transcript, the Department of Geography and Geology may require completion of undergraduate stem courses as a condition for admission. For entry into the program, all students must have had GEO 444 (Introduction to GIS) and GEO 435 (Applied GIS) or their equivalent, or they must have worked in the GIS field. Applicants that have not had the equivalent of GEO 444 and GEO 435, and who desire to have these courses waived based on prior experience in the GIS industry, must supply a detailed work history in support of their request.

Effect on Existing Programs at SHSU

The proposed degree will complement and strengthen existing programs at SHSU. For example, geospatial technologies are used extensively in business, law enforcement, counterterrorism, the military, and energy industries, such as oil and gas exploration. Therefore the applied GIS program offerings will complement the Master of Business Administration degree, the Agriculture Program, the Criminal Justice Program, LEMIT and the Military Science Program by providing graduate students affiliated with these programs the opportunity to take GIS courses that will supplement their studies. Although not directly related to the Digital Forensics program, the use of GIS has applications in this area as well. Students in the Digital Forensics Program, given their extensive knowledge of computer systems and software, could easily benefit from coursework in the applied GIS program. Both the Agricultural Science and Biology departments have a need for GIS-related course offerings; so they, too, could benefit by having optional electives from the Applied GIS program available for their graduate students. In fact, the Chairs of both programs have approached the department about the possibility of developing GIS courses relevant to their respective disciplines. Finally, business students, and any other students involved with the analysis of spatial data, can potentially benefit from taking coursework in applied GIS at either the undergraduate or graduate level.

B. Student Demand – The existence of other GIS programs in Texas universities, as well as enrollments in those programs, indicates that the proposed program should do well. For example, the Geography Masters degree program at the University of North Texas (founded 1995) has approximately thirty graduate students enrolled in the geography program. The geography program offers a focus in GIS and a certificate in GIS. Texas State University – San Marcos is the largest geography program in the United States and has 147

masters students and 70 Ph.D students. These graduate students are divided among three specializations, one of which is GIS. Texas A&M – College Station has a graduate geography program with nine students in its Spatial Science masters degree program. The University of Texas at Dallas (UTD) offers both a masters and PH.D in Geospatial Information Science that is offered jointly between the School of Economic, Political and Policy Sciences, and the School of Natural Sciences and Mathematics. (The numbers cited above regarding enrollments were obtained from the Guide to Geography Programs in the Americas: 2006-2007.)

In terms of course content and objectives, the proposed program is very similar to an online program at Northwest Missouri State University (NWMSU), located ninety miles north of Kansas City. This program was begun in 2002 and by its second year, more than thirty students were enrolled (Haddock, per. comm., 2006). Although this is an online program, the rapid development of the program at NWMSU suggests that the proposed program at SHSU has an excellent chance of success, especially in light of the fact that the Houston area has a much larger population than Kansas City and the fact that NASA and numerous petroleum companies are located in Houston.

The Department of Geography and Geology at Sam Houston State University currently has approximately 45 official and unofficial majors and 67 official and unofficial minors. The minors are divided among the standard Geography minor, as well as the GIS and GSS (Geospatial Science) minors. In order to assess our students' interest in the proposed Masters degree, the department conducted a survey of students in four upper division classes. A total of 27 students completed the survey and all respondents had some experience with GIS. A copy of the survey and the results are provided in Appendix 1. Of the 27 respondents, sixteen (59%) said that they believed that there would be very strong interest in the program and nine (33%) said that interest would be somewhat strong. Four (15%) of the respondents said that they were "certain" that they would enroll in the program, and twelve (44%) said that there was a "high" or "very high" possibility that they would pursue the degree. The survey results, in combination with the existing high demand for GIS professionals and the projected growth in all areas of government and business involved with spatial analysis indicates that the proposed degree has a very high probability of success. Although the geology majors and minors in our department were not surveyed, the departmental advisors are strongly encouraging them to take GIS and related courses because of the clear need for such skills in the energy and environmental areas of geology. This, too, may increase student demand for a graduate program among alumni.

The pool of potential students is by no means limited to our alumni. As discussed previously, the Houston area is the center for the oil and gas industry and other industries that rely on GIS technology. The City of Houston and surrounding communities rely on GIS for planning purposes, and there are several GIS companies located in the Houston area. Accordingly, we anticipate that many individuals from these industries will enroll in our program in order to enhance their job skills and marketability. Needless to say, individuals from throughout the State, and elsewhere, will also enter the program.

- 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	12	17	23	27	30
FTSE	9	12.75	17.25	20.25	22.5

- The FTSE formula used to complete this table is: (Headcount x 9 credit hours)/12. It is based on the assumption that students will take an average of nine credit hours per semester.
- The headcounts in the table represent total enrollments in each year of the program.

II. Quality

A. Degree Requirements – Use this table to show the degree requirements of the program.

Category	Semester Credit Hours	Clock Hours
General Education Core Curriculum <i>(bachelor's degree only)</i>	NA	
Required Courses	<u>24 hours</u> GEO 531, 532, 533, 534, 535, 536, 537, 611, 621	
Prescribed Electives	<u>6 hours *</u> GEO 698 & 699	
Free Electives	<u>6 hours</u>	
Other (<i>Specify, e.g., internships, clinical work</i>)	(if not included above)	
TOTAL	36 hours	

* Students who choose a non-thesis option will be required to take six additional free elective hours, for a total of twelve elective hours. These extra six elective hours must be taken from the Geography graduate program offerings.

B. Curriculum – Use these tables to identify the required courses and prescribed electives of the program. Courses followed by an asterisk (*) would be added if the program is approved. Students will be limited to a maximum of six hours of coursework at the 400-level. In addition, all 400-level coursework must require additional work to meet graduate-level requirements, and all such courses must be taught by members of the

Graduate Faculty. The courses listed from outside the Department of Geography and geology are subject to the approval of the departments which offer them.

Prefix and Number	Required Courses	SCH
GEO 531*	Geographic Information	3
GEO 532*	GIS Principles and Applications	3
GEO 533*	Internet GIS	3
GEO 534*	Spatial Analysis	3
GEO 535*	Digital Image Processing	3
GEO 536*	Cartography and Visualization	3
GEO 537*	GIS Programming	3
GEO 611*	Graduate Seminar in GIS	1
GEO 621*	Seminar in Applied GIS Research Methods	2

Prefix and Number	Prescribed Elective Courses and Free Elective Courses	SCH
GEO 698*	GIS Thesis (Thesis)	3
GEO 699*	GIS Thesis (Thesis)	3
GEO 538*	ESRI Courses (ESRI)	3
GEO 539*	Internship (Intern)	3
GEO 433	Field Studies	3
GEO 436	Urban Geography	3
GEO 437	Population Geography	3
GEO 448	Remote Sensing	4
Gel 446	Hydrogeology	4
Gel 443	Methods in Applied Geophysics	4
Bio 581	Ecological Computer Modeling	3
CJ 535	Security and the Future	3
CJ 539	Global Terrorism	3
CJ 636	Computer Applications for Criminal Justice Management	3
CJ 793	Computer Based Data Analysis	3
MGT 475	Operations Management	3
MIS 438	Advances in Information Systems	3
MKT 464	Internet Marketing	3
MKT 471	International Management and Marketing	3

MKT 477	Supply Chain Management	3
MKT 471	International Management and Marketing	3
AGR 434	Agribusiness Marketing	3

B. Faculty – Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program.

Name of <u>Core</u> Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program <i>(% varies by semester)</i>
Dr. Gang Gong Assistant Professor	Ph.D. Boston University 2006	GEO 534, GEO 535, GEO 537,	50-75%
* Dr. Mark Leipnik Associate Professor	Ph.D. University of California, Santa Barbara 1995	GEO 531	25-50%
New Faculty: Dept. Chair – Probably Associate Professor		GEO 532, GEO 533, GEO 536	50% *For Chairs, this constitutes 100% of their teaching load.

Note: GEO 611, GEO 621, GEO 538, GEO 539, GEO 698 and GEO 699 may be supervised by any members of the department involved with the graduate program; accordingly, these courses are not listed in the table.

Name of <u>Support</u> Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program
Dr. Don Albert Associate Professor	Ph.D. Univ. of North Carolina at Chapel Hill, 1996	GEO 437	incidental
Dr. John Strait Assistant Professor	Ph.D. Univ. of Georgia, 1999	GEO 436	incidental
Dr. John Degenhardt Assistant Professor	Ph.D. Texas A&M, 2002	Gel 433	incidental

Note: The 400-level courses listed are elective courses within the program. Because these do not constitute courses taught to the exclusion of the normal undergraduate teaching loads of the faculty members, the “assigned time” is listed as “incidental”. The 400-level courses listed will be taught once per academic year.

Discussion of Faculty Requirements

The number of faculty members capable of teaching the required graduate courses is currently insufficient. Therefore, the proposed degree will require one new permanent faculty position and we expect that the individual hired for this position will also serve as the Department Chair. Because both Dr. Leipnik and Dr. Gong will have to give up some of their undergraduate teaching load in order to teach the graduate courses, we will have to hire an adjunct to cover their former courses (one per semester). This number of courses may seem too small given Dr. Leipnik's and Dr. Gong's anticipated graduate teaching loads, but it is realistic because the department is reducing the number of introductory geography courses (GEO 161) it offers each semester in response to changes in teacher certification requirements that were made by the College of Education. These changes, which were implemented in the spring of 2008, significantly reduce the number of education majors required to take GEO 161. As a result, we are eliminating two sections, thereby enabling Dr. Gong to teach the graduate classes. Given these conditions, only one new, permanent position is needed to support the graduate program. The permanent faculty position would require a starting salary of about \$65,000-70,000. The Dean of the College of Arts and Sciences has agreed to support the program with this position when funds become available; hopefully in 2009.

The proposed cycle of graduate course offerings is shown below.

Possible Sequence of Graduate Courses

<u>Fall</u>	<u>Spring</u>	<u>Sum</u>	<u>Fall</u>	<u>Spring</u>	<u>Sum</u>	<u>Fall</u>	<u>Spring</u>
531	531	531	531	531	531	531	531
*534	532	*533	*534	532	*533	*534	532
536	*533	611	536	*533	611	536	*533
535	621	532	535	621	532	535	621
532	537	535	532	537	535	532	537
611			611			611	
698/699	698/699	698/699	698/699	698/699	698/699	698/699	698/699
539	539	539	539	539	539	539	539
*538	*538	*538	*538	*538	*538	*538	*538

Note: Courses shown in blue will be taught by Dr. Leipnik, those shown in red by Dr. Gong, those shown in green by the new faculty member, and those shown in maroon by any graduate faculty member supporting the GIS program.

Note: Courses listed with an asterisk next to them will be taught as internet courses. Combined with the Internship course, this means that one third of the degree (twelve hours) can be obtained off-campus. This should increase the attractiveness of the program to students who commute.

The proposed curriculum is structured in such a way as to allow students to enter the program at any time, and will allow students to take up to twelve hours per semester. As shown above, GEO 531 (Geographic Information) is taught every semester to enable students needing basic GIS skills to start the program during any semester. As is evident, several of the other

courses are offered every other semester (i.e., spring or fall) and several are offered in the summer. The ESRI-type virtual course, the Internship course, and the Thesis Project courses are offered every semester. This will enable students to complete the program within two years, and that fact should make the program attractive to prospective students.

- D. Library – The Library's assessment of the cost of new resources is provided in Appendix 2. The Library provides online access to four of the five journals identified as needed for this program. Full-text articles from the following journals are available in Academic Search Premier: Geographical Analysis, International Journal of Geographical Information Science, The International Journal of Remote Sensing and Transactions in GIS, Academic Search Premier provides access from at least 2003 to 2006 for all of these titles. Because a three to eight year online archive is available for these titles, the Library will monitor interlibrary loan requests to determine when the Library should acquire a current subscription to these titles. Photogrammetric Engineering and Remote Sensing is only available in print at this time. Interlibrary loan requests will be monitored to determine when this title should be acquired. To keep the cost of these new resources to a minimum, the Library recommends purchasing online access with a permanent archive for the four titles currently available online. If the Library adds all five titles in one year, the cost could range from \$9,168 to \$12,463 according to when the subscriptions are entered. A cost comparison of print and online is provided in Appendix 2. An estimate of the cost of subscribing to the five titles (four online and one print) is also provided in Appendix 2.
- E. Facilities and Equipment – The Geography Program currently has a state-of-the-art GIS lab that is equipped with thirteen computers with dual-screen monitors. The lab contains a large format printer and other ancillary equipment used for GIS-related work. In addition, the Program has a separate Computer Cartography/Remote Sensing Lab that is also equipped with thirteen computers and monitors. Both of the labs are linked to the University's server and the University currently has software licenses with ESRI. The department also has software license agreements with ERDAS and SAIC that cost \$3,400 per year. The license with ESRI enables the students in the program to take many ESRI virtual courses at no additional charge to the student. These ESRI courses can constitute electives for students in the graduate program. We do not need to purchase any additional software licenses at this time, although this may become necessary at some point in the future depending upon advances in technology and software.
- Because of the amount and quality of the department's equipment, the department does not anticipate additional hardware needs to begin the program. It will be necessary to periodically upgrade software and replace equipment. This cost will be shared by both the undergraduate and proposed graduate program budgets.
- F. Accreditation – There is no accrediting agency for Geography or GIS.

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.

Five-Year Costs		Five-Year Funding	
Personnel ¹	\$604,160	Reallocated Funds	\$0
Facilities and Equipment	\$0	Anticipated New Formula Funding ³	\$340,805
Library, Supplies, and Materials	\$69,354	Special Item Funding	\$0
Other ² (Travel)	\$10,000	Other ⁴ (Tuition)	\$421,176
Total Costs	\$683,514	Total Funding	\$761,981

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). See below.
2. Specify other costs here (e.g., administrative costs, travel). See below
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. See below
4. Report other sources of funding here. In-hand grants, “likely” future grants, and designated tuition and fees can be included. See below

Costs and Funding Details

Personnel Costs

Our request for one new faculty position is based on the need to have a third person to support the Masters degree. As stated previously, this individual would also serve as the Department Chair. The cost of the new faculty position will be the single largest expense associated with the program. Given the demand for GIS in the market place and the salaries that individuals with Ph.D.'s may earn, a competitive salary is approximately \$70,000 per year for the graduate faculty position. In fact, the most recent faculty additions to the department, which have technical expertise, were hired at a salary of \$65,000 per year. The adjunct faculty position is estimated to be approximately \$6,000 per academic year.

The GIS graduate program would need graduate teaching and/or graduate research assistantships for prospective graduate students. Initially, we would like to have at least two, half-time graduate assistants in the program to support graduate faculty members. .

Calculations:

Faculty – 1 positions at \$70,000, assumes 28% benefits and 3% increase per year.

Graduate Assistantships – 2 half-time positions at \$9,846/year.

Adjunct position – assumes two courses per year @ \$3000 per course

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Faculty	89,600	92,288	95,057	97,909	100,846	\$475,700
Grad Asst	19,692	19,692	19,692	19,692	19,692	\$98,460
Adjunct	6000	6000	6000	6000	6000	\$30,000
Total Costs						\$604,160

Library, Supplies, and Materials Costs

The University library would need to purchase academic GIS journals to provide learning resources for the faculty and students. The library has indicated that its cost to support the program would be \$54,354 for the first five years.

All values are approximations based on information currently available. The cost of computer equipment and software licenses that will be used is already subsumed under the existing lab expenses associated with the undergraduate program. Therefore, we do not anticipate any significant cost increases associated with the program as regards equipment and software. However, we have estimated a cost of \$3000/year (\$3,000 x 5 years = \$15,000) for materials and supplies.

Travel Costs

To keep abreast of the rapid changes in the GIS field, the faculty members will need to attend conferences each year. As a point of reference, the Annual Users Conference in San Diego that is sponsored by ESRI costs approximately \$1,000/attendee. Therefore, we assume an additional travel cost of \$2,000 per year.

Funding

Course Load – Students are assumed to take an average of 18 hours per year.

Formula Funding – Based upon a rate of \$236.67/SCH as identified in the THECB's "Formula Funding Codes and Rates for FYs 2008-2009."

Tuition – Based upon a rate of 198/SCH (\$50 tuition, \$98 designated tuition, \$50 graduate tuition.)

Distance learning – additional distance learning fee of \$300 per course that applies to two required courses in the program. Calculation assumes one internet course per year per student.

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Headcount	12	17	23	27	30	
Formula Funding	0	0	97,981	115,022	127,802	\$340,805
Other (Tuition)	42,768	60,588	81,972	96,228	106,920	\$388,476
Other (Distance learning)	3,600	5,100	6,900	8,100	9,000	\$32,700
Total Income						\$761,981

Summary

The field of GIS is one of the most rapidly growing professional fields, and the demand for individuals trained in this geospatial discipline exceeds the supply. This situation is projected to continue into the foreseeable future, as more and more businesses and government agencies incorporate this needed technology into their operations. SHSU is located a mere 70 miles from the fourth largest city in the country, a city whose economy is strongly linked to geospatial technology. At SHSU, the Department of Geography and Geology has the facilities already in place to offer an Applied GIS Masters degree, a degree that will fill a market niche that is in strong demand. Furthermore, this program would add to the university's prestige and support its mission to increase its program offerings and increase enrollments. Now is the right time to develop this program.

Signature Page

1. Adequacy of Funding – 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. Board of Regents or Designee Approval – 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. Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval – 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

Appendix 1: Student Survey Results

Appendix 2:
**Librarian's Report on Availability of Resources and
Projected Costs of Journal Subscriptions**

Appendix 2: Librarian's Report on Availability of Resources and
Projected Costs of Journal Subscriptions

Suggested Journals for the Proposed Masters of Science Degree in GIS Library recommends acquiring online only access to GIS journals where possible										
Title	2007		2008 ¹		2009 ¹		2010 ¹		2011 ¹	
	Print	Online*	Print	Online*	Print	Online*	Print	Online*	Print	Online*
Geographical Analysis		\$220		\$235		\$250		\$267		\$286
The International Journal of Remote Sensing		5675		6072		6497		6952		7439
Transactions In GIS		1186		1269		1358		1453		1555
Photogrammetric Engineering and Remote Sensing	310		332		355		380		407	
International Journal of Geographical Information Science		1777		2265		2424		2594		2776
Sub- Total	310	\$8858	332	\$9,861	355	\$10,529	380	\$11,266	407	\$12,056
Total		\$9,168		\$10,193		\$10,884		\$11,646		\$12,463
Total 5-year cost \$54,354²										
<p>*Includes permanent access</p> <p>¹Includes a 7% increase per year.</p> <p>²Cost will increase substantially for titles published outside the United States</p> <p style="text-align: right;">2/23/ 07 Rev 12/3/ 07</p>										

November 28, 2007

Dr. Marcus Gillespie
Department Geography and Geology
P.O. Box 2148
Sam Houston State University
Huntsville, TX 77341

Dear Dr. Gillespie:

A review of the Library's books, journals (print and electronic), government documents (including maps and datasets) found that the collection can support a Masters of Science Degree in Applied GIS without immediate additional costs. The Newton Gresham Library has a strong collection of books and government documents relating to GIS. The Library's journal collection contains Cartography and Geographic Information Science, and Computers & Geosciences, titles which often publish articles on cartography and geographic information systems. The Library's electronic resources provide access to full-text journal articles in such journals as Geographical Analysis, The International Journal of Remote Sensing and Transactions in GIS; all 3 are available from at least 2003 to 1 year ago. The Library has recently acquired access to the ICPSR archive of social science data which will provide datasets for instruction and research. Close monitoring of interlibrary loan requests will help determine when the Library should acquire a current subscription to the above titles. The attached table indicates the cost of acquiring a current subscription to the 5 journals identified in the course proposals.

In addition to the full-text databases, Academic Search Premier, and Wilson Omni Full-text, the Library provides access to GeoBase, an online bibliographic database covering geography and geology. The Library provides a computer program designed to direct the user to the best source for an article, (online, in the Library's collection or Interlibrary Loan); this program adds full-text linking to GeoBase. Both the ACM Digital Library and IEEE Computer Society Library contain peer reviewed journals; articles on GIS applications and GIS programming appear in these journals. The Library has access to ScienceDirect, Kluwer Online, and Wiley Interscience online journals; a keyword search of these databases indicates they contain articles on GIS applications.

For those resources not immediately available at Sam Houston State University, interlibrary loan and shared resources programs will provide access. All Texas state institutions and many private universities participate in TexShare, a cooperative resource-sharing program which permits borrowers in good standing at their home institution to obtain books on-site at participating institutions.

We in the library wish you well with this program. It will be an asset to the university. Please let me know if I can be of further assistance.

Sincerely yours,

Ann H. Holder
Director of Library Services