Geographic Information Systems MS

Goal 1: Prioritize Student Success by delivering a curriculum with appropriate discipline specific knowledge

Goal Description:

One of the primary objectives of the GIS graduate program is to provide appropriate knowledge and technical skills to students so that students are able to develop and demonstrate knowledge of geospatial principles as well as computational and technical skills to enable them to be successful in the geospatial workforce within Texas and beyond.

Students will learn the appropriate advanced Applied GIS and remote sensing knowledge and skills.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
2. All graduate students will demonstrate the ability to communicate knowledge of advanced applied GIS and geospatial principles.
3. All graduate students will have the knowledge and skills to apply/utilize the most advanced geospatial techniques
4. Students will acquire knowledge and skill sets that will make them competitive in the ever evolving geospatial job market within the state and beyond.

RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

All graduate students will demonstrate a mastery of applied GIS principles and applications through a written graduate comprehensive examination, administered by a committee of three graduate GIS faculty members. The examination will consist of questions about the theory, concepts and applied principles of Geographic Information Systems, Science and Remote Sensing techniques to real world problems and issues. A committee of graduate faculty members who offer graduate courses in the subject areas will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area. The comprehensive exam will evaluate student's understanding of the material covered in all the graduate classes.

Criterion Description:

Each student must earn at least a "Pass" mark in each examined area to pass the written comprehensive exams. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

Four students took their comprehensive exam in fall 2022. Each student selected a comprehensive examination committee consisting of three faculty members who offer graduate GIS classes. Questions for the comprehensive examination were drafted by the student's comprehensive examination

committee members. Off the four students who took their exam in fall 2022, one students earned a grade of High Pass in atleast one section. All the students earned a grade of Pass.

Four more students took their comprehensive exam in spring 2023. Out of the four students, two students earned a grade of High Pass in two sections. All the other students earned a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. The comprehensive exams thoroughly evaluates their grasp of these concepts before they graduate with a master's in GIS degree from Sam Houston State University. We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate in which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

We will continue to offer advanced GIS courses that make our graduate students more marketable in the GIS job industry. Based on feedback we received from industry experts we offered Internet GIS course in fall 2020 that uses ESRI's cloud based solution - ArcGIS Online and we will continue to offer that class every fall semester and continue to improvise. We also offer courses on GIS Programming using Python, LiDAR technology, ArcGIS Pro. These are skillsets that all Master's students must have to be marketable in the competitive job market. Graduate GIS students need experience in Python programming, ArcGIS Server and ArcGIS Online for Organizations. The GIS industry has upgraded to a new GIS software, ArcGIS Pro and the use of cloud based solution, ArcGIS Online for Organizations. All employers expect students with a Master's degree in GIS to be familiar with these two GIS platforms in addition to python programming. So we will also continue to review plans to upgrade to the next generation of GIS software, ArcGIS Pro.

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We are also offering new graduate courses in online format to increase our online graduate GIS course offerings. The GIS Master's program continues to receive queries from working professionals who are interested in pursuing a master's degree but cannot commit to driving to Huntsville or the Woodlands campus. An online degree is best suited for such candidates. As we enroll more students in the professional track we have to keep up with the most updated versions of software and the latest theories, concepts and software programs and ensure that students in the Applied GIS Master's program master the latest advanced applied GIS knowledge.

GIS is an applied field and therefore we have to ensure that our hardware and software is up to date and the most current version. For this the graduate program heavily relies on support from SHSU IT.

RELATED ITEM LEVEL 1

Acquire the most up to date geospatial infrastructure for graduate students to be workforce ready

Performance Objective Description:

The graduate program will make all efforts to acquire and install the latest geospatial infrastructure so that we are able to provide our graduate students with the knowledge and training that prepares them in every way for the job market or pursue a doctoral degree. This will support the graduate program's goal to prioritize graduate student success, embody a culture of excellence within the graduate program and train students to be ready for the job market who contribute to the economy, and thereby elevate our service to the State and beyond.

RELATED ITEM LEVEL 2

Comprehensive exams

KPI Description:

Students are required to take a comprehensive exam which will evaluate their mastery of geospatial principles and applications. Students must successfully pass the exam in order to graduate with a Master's degree. The comprehensive exam will also examine their readiness in using the most updated geospatial platform to ensure they are prepared for the competitive workforce and enhance the reputation of our graduate program.

Target Description:

At least 80% of graduate students taking their comprehensive exam will pass their exam on their first attempt. 100% will pass on their second attempt.

Results Description:

Four graduate students took their comprehensive exam in fall 2022 and four more took their comprehensive exam in spring. In fall we had one student who had earned a grade of High Pass in one section and all the other students passed the comprehensive exam in their first attempt with a grade of Pass. In spring, two students earned a grade of High Pass and all the other students passed the comprehensive exam in their first attempt with a grade of Pass.

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Goal 2: Prioritize Student success by upgrading to ArcGIS Enterprise as the licensing mechanism and user management system for GIS graduate classes

Goal Description:

In order to ensure that students who graduate with a Master's degree in GIS are competitive in the job market the next primary goal of the graduate program is to impart curriculum utilizing the most updated GIS technology that includes ArcGIS Pro and ArcGIS Online, part of ArcGIS Enterprise. Most employers in the state expect students with a master's degree in GIS to have expertise in these application platforms.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

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Goal 3: Embody a culture of excellence by recruiting efforts for the graduate program

Goal Description:

The program will continue efforts to recruit quality students for the graduate program to embody a culture of excellence within the graduate program. The graduate program will reach out for assistance from the University for those efforts.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

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Findings Description:

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RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

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RELATED ITEM LEVEL 1

Recruit quality graduate students to embody a culture of excellence within the graduate program
Performance Objective Description:
The graduate program will continue all efforts to recruit quality students who join the GIS graduate program and work with faculty members on research projects to embody a culture of excellence within the graduate program.

RELATED ITEM LEVEL 2

Comprehensive exams
KPI Description:
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Goal 4: Embody a culture of excellence and conduct research and publish to bring greater visibility to the GIS graduate program.

Goal Description:

An important component of graduate teaching is research and publication. We will continue with our efforts to conduct research and publish in well respected peer reviewed journals and focus on involving graduate students in research activities.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

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Goal 5: Train graduate students who will expand and elevate our service to the State and beyond

Goal Description:

An important goal of the GIS graduate program is to train students who are well prepared for a competitive job market and contribute positively to the State and beyond. This will also enhance their upward social mobility.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

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Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

As last year we will continue efforts to be able to offer courses that use latest version of GIS software. The GIS industry has upgraded to a new GIS software, ArcGIS Pro and the use of cloud based solution, ArcGIS Online for Organizations. We will continue reviewing efforts to offers courses that use ArcGIS pro instead of ArcGIS desktop and ArcGIS Online instead of ArcGIS Server. All employers expect students with a Master's degree in GIS to be familiar with these two GIS platforms as indicated by reviews submitted by employers where we had GIS graduate students either engaged in an internship or a fulltime job. Upgrading to an ArcGIS Enterprise as the licensing mechanism and user management system is a rather large endeavor and will require the department to work closely with SHSU IT for campusiwde installation. We will work very

closely with the IT department to overcome the technical hurdles faced when offering such courses on campus. We have started preliminary conversations with IT. Currently, a faculty member also performs the role of a GIS software administrator. In order to provide our graduate students instruction using the latest technology we have to upgrade the technology. We will evaluate plans to bring on-board a GIS software administrator atleast on a part-time basis.

We are also looking at including drone technology and data processing captured by means of drone into our graduate course offerings. The department has acquired a high quality drone that will be incorporated into graduate teaching.

Currently all our graduate students have been successful in procuring an internship or a full time job opportunity by the time they are in their second year of the program. Students who were working fulltime when they joined the graduate program have progressed in their career by the time they graduate from the Master's program. As per reviews submitted by employers where GIS graduate students were engaged in an internship opportunity or working fulltime, employers are very pleased with the technical and conceptual competence of our graduate students.

We will also continue to evaluate student progress by administering a comprehensive exam typically taken during the third semester and by using final projects in all GIS graduate courses. The comprehensive exams are a very useful tool in examining student learning in the graduate program. Students are given either a High Pass, Pass or Fail. Students who fail the exam must re-take the exam in their next semester. Most of the students have passed the exam with a grade of Pass. Very few students earn a grade of High Pass. We will continue to monitor students who earn a grade of Fail and also examine the underlying reasons.

Another tool used to evaluate student learning are projects. All graduate students must work on final projects in every graduate course. Students work individually on these projects to demonstrate their understanding of the course material and their ability to apply that material in a real-world scenario. Final projects are a key component of a student's final grade.

The number of international students who were able to join the program has taken a hit due to the pandemic. The graduate program in collaboration with the Office of International Programs and Graduate Admissions will work towards strategies that make it easier for good quality international students to join the program after they are accepted.

An important component of graduate teaching is research and publication. We will continue with our efforts to conduct research and publish in peer reviewed journals. Such activities bring visibilty to the program, department, College and the University.

Update of Progress to the Previous Cycle's PCI:

Comprehensive exams for the GIS Master's program are scheduled during fall and spring semesters. In fall 202s and spring 2023 the comprehensive exam was held over a five day period. A total of 8 students took their comprehensive exams during the 2022-2023 academic year. All students taking their comprehensive exam were either in their third or the fourth semester and had completed 30-33 credit hours of graduate coursework. Each student had selected a comprehensive exam advisory committee and were posed questions by their respective committee members.

In fall 2022 four students took the comprehensive exam. One student earned HIGH PASS in atleast one section of the comprehensive exam.

In spring 2023, four students took their comprehensive exam. Two students earned a grade of HIGH PASS in one section.

The students who earned a grade of High Pass or Pass in fall 2022 and spring 2023 semesters are all who have done particularly well in the graduate program demonstrating a thorough understanding of the theories and principles of geospatial technology.

The graduate program is gradually starting to offer more and more classes using the latest GIS software, ArcGIS Pro. The graduate program offered two courses, one in fall 2022 and another in spring 2023, where students used ArcGIS Pro. However, we were able to offer ArcGIS Pro to the students enrolled in these courses because they worked on the class material using their personal device. We are yet not able to offer GIS courses on campus either at the main campus in Huntsville or at the Woodlands Center that utilize

ArcGIS Pro. We are in the process of working with SHSU IT to get their assistance. ESRI deploys their GIS system either through ArcGIS Online or ArcGIS Enterprise. The University has an instance of ArcGIS Enterprise on its server, but it does not work and, unfortunately, has never worked correctly. Its post deployment setup has never been completed. We are working with SHSU IT on this matter. The department has made this its priority and added it to the department's strategic plan.

In fall 2022, three students graduated with a GIS Master's degree. In spring 2023 four students graduated with a Master's degree and one student received a graduate GIS Certificate. Majority of our students were able to obtain internships or full-time jobs soon after graduating. Most of our graduate students are working full-time or are pursuing higher education. We are still struggling with international students joining the graduate program but those are due to factors beyond our control. We will continue with our efforts to recruit more international students in the graduate program.

Plan for Continuous Improvement Item

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We are also looking at including drone technology and data processing captured by means of drone into our graduate course offerings. The department has acquired a high quality drone that will be incorporated into graduate teaching. Moreover, we have a new faculty member joining the department in fall 2023. The faculty member specializes in remote sensing and we are looking forward to offering new graduate course/s in their area of specialization.

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