University Libraries
GIS Support

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Contents

Proposal Summary **3**

ArcGIS Software Overview **3**

Esri Technical Support **4**

ArcGIS Desktop 4

ArcGIS Online 5

Organizational Accounts 5

ArcGIS Pro & Extensions 5

Enterprise Issues with AGO 5

AGO Web Apps 6

Credits 6

Account Management & Cleanup 6

GEO Jobe Admin Tools 7

Licensing Support Statistics 8

ArcGIS Online License Use 9

ArcGIS Desktop License Use 11

Library-Led GIS Instruction **12**

Library GIS Web Presence **13**

Maps & GIS Website 13

Research Guides 13

Video Tutorials 14

Maps & GIS Help Desk **14**

Description 14

Service Hours 14

GIS Help Desk Staff 15

Library Specialist 3 15

GIS Technicians 15

GIS Data Collections **15**

Future Library Support for GIS **15**

Proposal Summary

The University Libraries have supported licensing for Esri software for more than a decade. There are 1,000 ArcGIS Desktop Licenses hosted on a Library server for student use on personal devices. Library employees also provide administrative licensing support for ArcGIS Online, a cloud-based version of the GIS software for all Texas A&M University students and employees. Library faculty, staff, and student employees provide troubleshooting support for this software both virtually and in-person. Currently, a member of the Library faculty is listed as primary contact for ArcGIS software support, serving the Texas A&M campus.[1]

The Libraries no longer have the dedicated human or technical resources to continue with the current licensing and support model for ArcGIS software. We propose that members of the Libraries and our campus stakeholders identify and enact an alternative model for GIS support by May 2020. To facilitate this transition, the Libraries conducted a self-study of Esri ArcGIS licensing support services. This report serves as a guide to discourse with stakeholders throughout the Spring 2020 semester in order to articulate and execute a strategy for redistribution of GIS software licensing services at Texas A&M University.

This report defines the distinct license types curated and supported by the Libraries and provides an overview of the instructional and consultation services dedicated to this software. The report will be shared with stakeholders of GIS software across campus for comments and questions. Once comments are collected and combined, the Libraries will hold a series of meetings with stakeholders to co-construct a roadmap for licensing support alternatives. This roadmap will guide the redistribution of licensing and technical support models in order to develop a flexible and sustainable structure for this critical software license that contributes to the curricular and research objectives of Texas A&M University.

ArcGIS Software Overview

- **Esri Software**: Esri is a company that designs software applications that combine mapping and data analytics to deliver geospatial intelligence.[2] TAMU Division of Information Technology manages the enterprise Esri license for the campus. Esri provides both ArcGIS Desktop and ArcGIS Online Pro software packages.

- **ArcGIS Desktop (Desktop)**: TAMU IT sells individual licenses for ArcGIS Desktop to the colleges to recover the cost of the enterprise license. As a bonus to paid licenses, Esri provides the campus 1,000 additional ArcGIS Desktop licenses for students, free of charge. The Libraries distribute and support these licenses.

- **ArcGIS Online Pro (AGO)**: This package is included in our campus enterprise license and has no limit on the number of accounts created by TAMU users. Both faculty and students

[1] https://sell.tamu.edu/Departments/Departmental_Software_List_A-G/ESRI_Software_License.php

[2] https://www.esri.com/en-us/home

can create AGO accounts. This package is managed by a University Libraries faculty member.

Esri Technical Support

Esri allows two technical support seats with the TAMU license subscription. These individuals are allowed to open help tickets on behalf of users, download the installation packages from Esri, talk with Esri support on the phone, and manage the campus license. This is managed through their online profile or by using a code that is given to them when talking with Esri support over the phone. Library faculty member, Sierra Laddusaw has one of these spots, the other is Romona Stites, Software Distribution and Sales Manager at TAMU IT. Sierra handles user support and help tickets, Romona manages negotiating and paying the campus license.

For users of ArcGIS Online (AGO), Sierra's name appears on the TAMU Organizational Account as the "Designated Administrator." This lists her email as the point of contact for the organization and any automated emails generated by AGO and emails from users go to her email inbox. Additionally, Sierra receives any communications to the organization from Esri.

Technical support happens at varying levels, but having a basic knowledge of the suite of Esri software available to the campus helps immensely when responding to requests for support. Most technical support requests that Sierra receives can be resolved without opening a help ticket with Esri. These support requests can be a simple learning curve for a user working on a class project, or an error code that does not have proper documentation on Esri's public help forms or Stack Exchange. Sierra only opens help tickets for issues that appear to be an enterprise issue or are related to ArcServer, or our colleges administering accounts for a lab or department.

ArcGIS Desktop

Library licensing for ArcGIS Desktop is currently provided to TAMU students for their personal computers, non-students have to go through TAMU IT to purchase licenses. Students access the installation file for the software and instructions on licensing the software from the Maps & GIS Services webpages.[3] This process requires students to "check out" a license from the Library license server, all licenses expire each October and students have to "check out" a new license at that time. The Library currently has 1,000 licenses available for use on the server.

At Maps & GIS students and staff provide technical assistance with installing and licensing the software. These interactions usually last thirty minutes or more. There are several issues that students commonly face when installing and licensing Desktop:

- Not entering the license server correctly.
    - The TCP/IP protocol setting on their computer is not being set to automatically obtain IP and DNS server addresses. To address these issues students are advised via email to follow specific steps identified in Appendix A.
- Attempting to install the software on a Mac.
    - Esri software is not compatible with the Mac OS, they will need to install Bootcamp on their laptop. The Student Computing Center can help with installing Bootcamp

[3]University Libraries Maps & GIS Website https://library.tamu.edu/services/map_gis/services.html

On the Esri software lifecycle page ArcGIS Desktop is currently slated to stop receiving development sometime between 2021 and 2023, with software support retiring between 2023 and 2025, and the entire suite being retired in 2025.[4] Desktop users need to migrate to ArcGIS Pro, Esri's newer platform that will eventually replace Desktop.

ArcGIS Online

Organizational Accounts

The TAMU ArcGIS Online Organizational Account is open to membership from anyone in the system who has a TAMU NetID and password. Users authenticate into the system via CAS login and have an account automatically created on first login. An ArcGIS Online (AGO) account is required for accessing ArcGIS Pro and ArcGIS Web Apps.

ArcGIS Pro & Extensions

ArcGIS Pro licenses are managed through the TAMU ArcGIS Online Organizational Account for the TAMU System. Users are automatically licensed for Pro on their first login to the Organizational Account, this provides them with full access to Pro and its various tools. However, it does not provide them access to all extensions available for the software, these additional extensions have to be manually applied when requested by the user. The installation file for the Pro software is currently located on Sierra's TAMU Google Drive, the link is sent out upon request along with installation instructions[5]. The Pro license auto renews in October. In theory, user accounts for AGO will auto-renew, but there have been enterprise-wide issues with renewals.

Enterprise Issues with AGO

The October 2019 renewal came with changes to the platform made by Esri which required all users to have their accounts updated via Python script and relicensed manually. There is no guarantee that next year will be smoother if Esri makes additional updates to the platform. As of October 2019, there are 3,052 users licensed for Pro with a total of 3,500 licenses available to the System.

December 2019 presented a new issue, AGO updates its SAML Certificate annually and the certificate expired in December preventing access for all TAMU System users to the portal. In order to fix this TAMU IT was contacted so they could add the new SAML Certificate metadata to our system allowing Shibboleth logins to function. This metadata update has to be performed annually by TAMU IT. A technical article for the 2019 certificate update is available online: https://support.esri.com/en/Technical-Article/000022078

AGO Web Apps

The following Esri Web Apps require an AGO account to access:

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[4] Software lifecycle: https://support.esri.com/en/Products/Desktop/arcgis-desktop/arcmap/10-7-1#product-support

[5] AGO install instructions: https://docs.google.com/document/d/13wC6TpMUZ9quNpI7uhYSSw3JQ_F4D2PPIgYuQ78M9RE/edit?usp=sharing

Upon first login to AGO, users are automatically licensed for:

- Business Analyst
- Community Analyst

Web Apps that require manual licensing:

- ArcGIS Insights
- CityEngine
- GeoPlanner
- and Redistricting Online

The University has 3,500 licenses for each of these Web Apps. As the name implies, these applications are all web based and do not require an installation file for use.

Credits

According to Esri "credits are the currency used in ArcGIS Online for premium services." Premium services translate to anything a user could do on AGO – the University has an allotment of credits as part of our subscription and users are automatically issued 200 credits on their first login. For most users 200 is more than they will need, when a user expends all their credits both the user and the administrator (currently Sierra Laddusaw) receive an email notification. A list of what expends credits is available on Esri's website. [6]

The biggest credit consumers are users who geocode. Geocoding costs 40 credits per 1,000 geocodes and a user can burn through 1,000, - 10,000, or more credits in one sitting. Geocoding is the reason we limited the number of credits a user begins with, this allows me to email users who are geocoding through the AGO platform and direct them to the free geocoding service offered on campus through the GeoInnovation Lab. [7] A template email sent to users who have expended their first 200 credits due to geocoding is available in Appendix B.

Account Management & Cleanup

As of the October 2019 license renewal, the TAMU AGO account has 3,500 seats. Esri does increase the number of seats when asked, but before doing so Sierra cleans up the account twice a year to free up seats, during the winter and summer interims. This requires:

- Removing licenses from user accounts
- Removing any items associated with their account
- Removing them from groups
- Turning off their Esri access before deleting their account

In order to identify accounts for deletion, several factors are looked at:

- The last time the account was logged into,
- If the user is still enrolled as a student,

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[6] AGO credit descriptions
https://doc.arcgis.com/en/arcgis-online/administer/credits.htm#ESRI_SECTION1_709121D2C7694DCAB9B8592F36F7A5BA

[7] GeoInnovation Lab website: http://geoservices.tamu.edu/Services/Geocode/

- If the user is still employed at the University System.

Each user's account will show the last time they logged in and the directory search available from the Division of Information Technology is used to verify active affiliation.[8] Important steps to follow for cleaning up accounts and data in AGO.

- It is important not to delete any non-class assignment or test files, this requires looking at what a user has created.
- Most professors follow a practice Sierra set up to help cleanup go smoother, requiring their students to title classroom assignments with the class section. Additionally, anything titled "test" is removed.
- When data appears to support a web map, includes detailed metadata and tagging, or is used by multiple accounts, Sierra emails the user before deleting.
- If the user wants to keep the data, they are instructed to download a copy to a local location or to identify a different user account to move the data to.
- For faculty and staff accounts, if the users are still affiliated with the University but have not logged in to their AGO account recently, the accounts are not deleted.

GEO Jobe Admin Tools

A major part of administering the TAMU ArcGIS Online Organizational Account is managing users, their access levels, and the content they produce. This can be done through the Esri ArcGIS Online interface; however, it becomes tedious when needing to manage a large number of users and their content at once. A plugin exists that helps with this, GEO Jobe Admin Tools.[9] GEO Jobe offers a free set of tools and a subscription set of Pro tools, TAMU does not have a paid account.

With the free tools, the administrator:

- Quickly move, copy, and delete user created content
- Create, manage, and delete groups
- Update user roles, access levels, and descriptions
- Delete users
- Email users
- Export a list of all users

The free tools do not allow the administrator to:

- Add or remove user entitlements (aka licenses)
- Migrate users between organizations
- Mass import new user lists
- Change a user's credit allotment, level, and type/role
- Enable or disable user login ability
- Clone items, group, or roles

For future administrators, a paid version of GEO Jobe would make managing the account simpler and more streamlined. Having the ability to mass add or remove user entitlements and mass change

[8] Division of IT Directory Search: https://gateway.tamu.edu/directory-search/
[9] GEO Jobe Admin Tools: http://www.geo-jobe.com/admin-tools/.

user credit allotment, level, and type/role would allow for more flexibility and easier cleanup of the organizational account.

Licensing Support Statistics

Library faculty and staff began documenting GIS support interactions for Desktop and AGO on September 11, 2018. Support is documented by type (e.g. GIS support) and the length of the interaction. A brief description of the length of support Provided is below:

- Support lasting 5 minutes or fewer is likely a question about account set-up
- Supporting lasting 5-30 minutes required more in-depth knowledge of credit allocation or account configuration issues. Time and skill intensive work that is not often a single transaction, but multiple discussion via various communication platforms.
- Support lasting more than 30 minutes is indicative of a training or in-depth consultation on functions of the software and related data.

These statistics are a snapshot of the interactions and not a comprehensive capture of the depth of support. The depth of support interactions is often iterative and recursive; expanding beyond the initial capture of the interaction. Below are the number of AGO support interactions distributed by the duration of support.

ArcGIS Online Duration of Support by full-time Library faculty and staff
2018-09-11 to 2019-11-20

Duration of Support	Number of Support Interactions
Less than 5 minutes	92
5 to 30 minutes	147
More than 30 minutes	13
Total	252

ArcGIS Desktop Duration of Support by full-time Library faculty and staff
2018-09-11 to 2019-11-20

Duration of Support	Number of Support Interactions
Less than 5 minutes	10
5 to 30 minutes	33
More than 30 minutes	9

Total	52

ArcGIS Online License Use

The following tables provide a breakdown of license use across academic colleges, College Station Campus Services Units, Research Centers and Institutes, and A&M System Campuses. License use was pulled from the AGO platform and individual users were coded by affiliation using the TAMU directory search and the Undergraduate and Graduate Catalogs. AGO users can be students, faculty, and staff affiliated with the Texas A&M University System.

The table below identifies AGO license use by college. This table shows individual licenses grouped by colleges. University Studies is not classified as a College. However, a significant number of license users identified affiliation with this degree program rather than an official College.

Number of individual AGO licenses grouped by College Station Campus Services Unit	
Colleges	AGO Licenses
College of Geosciences	425
Mays Business School	148
College of Agriculture	93
College of Architecture	84
University Studies	49
College of Engineering	40
College of Liberal Arts	39
School of Public Health	9
Bush School	6
College of Education	6
College of Science	6
College of Veterinary Medicine	6
University Libraries	5
Independent Degree Program	1
College of Medicine	1
Grand Total	918

The following table provides the number of individual AGO licenses issued to TAMU College Station Campus Services units.

Number of individual AGO licenses grouped by College Station Campus Services Unit

College Station Campus Services Unit	AGO Licenses
Division of Information Technology	11
Utilities & Energy Services	3
Office of Mapping and Space	2
Transportation Planning	2
Office of External Relations	1
Office of Admissions	1
Honors Program	1
Blinn TEAM Program	1
Landscape Services	1
Total	23

The table below provides individual license use by TAMU Research Centers and Institutes. These users are primarily affiliated with the TAMU College Station Campus, but may be located at other System campuses or sites.

Number of individual AGO licenses grouped by Research Center or Institute.

Center or Institute	AGO Licenses
Institute of Renewable Natural Resources	11
Emergency Services Training Institute	2
Mobility Analysis	2
Applied Technology Department	2
Multi-Resolution Modeling	1
Real Estate Center	1
Harte Research Institute	1

Multimodal Freight	1
Health Services Research	1
Public Policy Research Institute	1
Texas Task Force 1	1
Research & Implementation - El Paso	1
Assoc VP External Relations	1
Center for Teaching Excellence	1
Emergency Operations Center	1
Military Land Sustainability	1
Total	29

The table below provides a breakout of license use by TAMU campus. The four campuses represented are the only campuses in the A&M system with license AGO license use.

Number of individual AGO licenses grouped by Campus

Campus	AGO Licenses
College Station	970
Galveston	13
Temple	3
El Paso	2
Total	988

ArcGIS Desktop License Use

Because ArcGIS Desktop Licenses are only issued to students currently enrolled in undergraduate or graduate programs at the University, data regarding Desktop Licenses were coded to reflect the number of licenses issued to students in each college or programs offered at the Texas A&M University Campus. Colleges that do not appear in the table below did not have affiliation with students who currently hold licenses as of November 1st 2019.

Number of ArcGIS Desktop licenses grouped by College

Colleges	Desktop Licenses

College of Geosciences	314
College of Agriculture	164
College of Engineering	107
College of Liberal Arts	107
College of Architecture	94
Bush School	23
School of Public Health	14
Interdisciplinary Degree Programs	11
Mays Business School	7
TAMU Galveston	6
College of Education	4
Libraries	4
College of Science	4
College of Dentistry	1
College of Veterinary Medicine	1
University Studies	1
Total	863

Library-Led GIS Instruction

The Libraries provide instruction for ArcGIS software as both course-integrated instruction based on a GIS assignment, or a workshop open to any individual with an interest in GIS. Instruction sessions can last between 1-3 hours.

The Libraries began documenting the number of instruction sessions on April 4th 2017. Below are the number of course-integrated instruction sessions and open workshops taught by Library Faculty between April 4 2017 and March 3, 2019.[10]

[10] Note: the Library faculty position dedicated to GIS services became vacant in Summer 2018. This position was not filled leading to a drop in instructional offerings.

Number of course and non-course related GIS instruction sessions led by Library faculty by year.

Year	Course Instruction	Open Workshops
2019	3	2
2018	8	6
2017	13	8
Total	24	16

Library GIS Web Presence

Maps & GIS Website

The Maps & GIS website is the primary web presence for GIS licensing support. Users access this page to request access to Desktop and AGO licenses. [11] Additionally, users can contact the maps-gis@library.tamu.edu for any support associated with these licenses. Directions for installing licenses are displayed on the ArcGIS for Desktop page once users authenticate using their NetID.[12]

Research Guides

The Maps & GIS unit curates four online research guides to support GIS software, data, and other GIS-related topics. Seven, course-specific research guides created by Library subject specialists pull content from the primary guides to support specific courses with a GIS assignment. Below is a complete list of research guides and their number of views since 2018.

Number of views of Library GIS research guides 2018-01-01 to 2019-11-26

Research Guide Title	URL	Views
Aerial & Satellite Imagery	https://tamu.libguides.com/aerialphotos	3172
Geographic Information Systems (GIS)	https://tamu.libguides.com/gis	9911
GIS Data Sources	https://tamu.libguides.com/gisdata	5410

[11] University Libraries Maps and GIS website: https://library.tamu.edu/services/map_gis/services.html
[12] Desktop installation instructions: https://docs.google.com/document/d/1xMnNTMK57JvxTP755NGvRlZRP9Uk5M-YcC6VO-QhG1c/edit?usp=sharing

Map Resources	https://tamu.libguides.com/maps	2156

Video Tutorials

The Maps & GIS unit created eight video tutorials teaching various GIS concepts. Videos were released in December of 2016 via the Libraries' YouTube channel. [13]

Number of views of GIS video Tutorials 2016-12-06 and 2019-11-26

Title	URL	Views
Accuracy Assessment of Image	https://youtu.be/alkkJKWX7Ng	11,852
Adding XY Data to ArcMap	https://youtu.be/F9oGFcmsR3k	11,791
Changing projections of XY data	https://youtu.be/oHylIHmfxVs	2,361
Formatting an Excel File in ArcMap	https://youtu.be/zLc3AYiBRG4	544
Georeferencing in ArcMap Tutorial	https://youtu.be/TWSZRwsZwfY	5,885
Re-Projecting Multiple Shapefiles	https://youtu.be/ufYbClsaR9g	627
Supervised Image Classification	https://youtu.be/ZN8LvXB1BSU	3,138
Unsupervised Image Classification	https://youtu.be/2tfvh9bZY4w	184

Maps & GIS Help Desk

Description

Maps & GIS, located on the second floor of Evans Library and provides access and research support for a robust paper map collection and digital geospatial resources.

Service Hours

The Maps & GIS service desk is open Monday-Friday 8:00 a.m. -5:00 p.m.

GIS Help Desk Staff

Library Specialist 3

- A full-time, hourly staff employee.
- Responds to requests for Esri licenses via email, phone, and in-person.
- Provides access to GIS data upon request.
- Manages and schedules four GIS Technicians and three Maps student employees.

[13] GIS YouTube videos: https://www.youtube.com/user/tamulibrary/videos

GIS Technicians

- Four undergraduate or graduate students staff the Maps and GIS Desk and respond to walk-in questions regarding ArcGIS software. Technicians work between 12 and 20 hours a week.[14]
- Three undergraduate students also assist with licensing as needed, but their primary duties are related to the physical maps collection.

GIS Data Collections

Geospatial datasets are collected and curated on an internal library server space. Data stored here is available to the TAMU community upon request. Currently, the library server holds geospatial datasets pertaining to campus, city, state, national, and global locations. Data requests are currently fielded through a request form or through the Libraries AskUS information request form.

Future Library Support for GIS

The Libraries are committed to supporting GIS as a vital component of the TAMU curriculum and research mission. As we have assessed our current work for this report, two new directions emerged as both highly vital to GIS support for curriculum and research. While we do not have a current stable workforce for the new directions described below, we can build capacity for this work by utilizing our student employees and creating new opportunities for graduate assistantships.

Data collections:

While the Libraries currently provide access to GIS data files upon request, current technologies and trends in open GIS data collection platforms will allow the Libraries to provide more accessibility to many of the datasets currently stored on a private server. Data can be searchable and immediately accessed by users through the Texas Data Repository, an open access platform for data preservation with specialized metadata fields for GIS data.[15] In the future, the Libraries could utilize GeoBlacklight to make these datasets more findable and accessible.[16] GeoBlacklight is a multi-institutional, open-source spatial data repository with specialized capabilities to share and contextualize GIS data across partner institutions.

GIS instruction:

The Libraries can build on the previous success of GIS instruction through the provision of short courses and workshops on various GIS topics related to:

- Finding and visualizing GIS data
- Managing GIS data throughout the research life cycle

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[14] See Appendix C for the GIS Technician position description.
[15] Texas Data Repository website
[16] GeoBlacklight website

- Preserving GIS data and maps in the Texas Data Repository
- Introduction to Georeferencing with open GIS data

These workshops could be taught in collaboration with campus stakeholders and can utilize GIS student technicians as instructors.

Appendix A.

License Server Troubleshooting Directions

- Copy/paste the license server address into ArcGIS Administrator rather than typing it in
- Set the TCP/IP protocol on their computer to automatically obtain IP and DNS server addresses
    - Instructions for setting the TCP/IP protocol:

        1. Open the control panel on your computer
        2. Navigate to Network and Internet settings
        3. Navigate to Network and Sharing Center settings
        4. Click "Change Adapter Settings"
        5. Choose your network connection, right click, and click properties
        6. Click "Internet Protocol Version 4" and then click properties
        7. Click "Obtain an IP address automatically" and "Obtain DNS server address automatically"
        8. Click Ok
        9. Click "Internet Protocol Version 6" and then click properties
        10. Click "Obtain an IP address automatically" and "Obtain DNS server address automatically"
        11. Click Ok
        12. Connect to the GIS License Server using the Arc Administrator

Appendix B.

Template Email to Geocoders Regarding Credit Use

You will have received an email indicating you have used all of your ArcGIS Online credits. Through the University's Esri subscription, we receive a set allotment of credits for the year for the entire campus to use. Credits are used to pay for storage, analytics, and data services. We limit each user to an initial 200 credits, when they have spent out those credits, we are able to allot more. We discourage the use of the Esri geocoder as it consumes a large number of credits quickly. As an alternative, I would like to direct you to a free geocoding service offer by the TAMU GeoInnovation

Center: http://geoservices.tamu.edu/Services/Geocode/ In addition to their coder, they link to several other free geocoders.

I have allocated additional credits to your account for completing other tasks, if you use these for geocoding, they will be used quickly and your account will not be allotted additional credits. Let me know if you have any questions.

Appendix C

GIS Technician Position Description

- Uses GIS (Geographic Information System) software to create simple maps and assist patrons with general GIS questions.
- Search, find, and download GIS files.
- Complete projects utilizing Google Earth technology.
- Assist patrons in finding maps, books, and GIS data for their projects.
- Check in/out materials and answer the phone.
- Uses the internet and library catalog for searches.
- Other duties as assigned.

Learning outcomes include:

- During students working time, they will learn how to communicate effectively in a professional setting through assisting customers in their requests/needs.
- Students will learn how to collaborate with team members by working with other student workers, staff and faculty to provide excellent service to our patrons.
- Students will become proficient in working with digital technology by assisting patrons with troubleshooting issues, searching for items in our library catalog, and consulting online search engines to solve problems.
- Students will develop professionalism by working in a small unit that frequently serves faculty and industry professionals. Often, students will be working directly with these individuals and will learn how to positively represent themselves and the department.
- Through individual projects, students will develop skills that will benefit them in their post-graduation careers. Projects have measurable impacts that students will be able to put on their resumes and communicate to potential future employers.
- Students will develop intercultural fluency by working with diverse patrons and co-workers.

Qualifications:

Required:

- Coursework or previous training or work experience in GIS, ESRI ArcGIS 10.x, and experience with vector and raster data

- Must possess excellent verbal communication skills and exhibit professionalism
- Able to lift up to 25 pounds, bend, stoop, and reach
- Must be reliable

Preferred:

- Knowledge of ArcGIS Server, Adobe Flex, ArcGIS Viewer for Flex, and Google Earth customization