GISTCP: Geospatial Technologies Undergraduate Certificate
May 31, 2016

Background

The certificate program was developed after extensive review of the potential market and extensive discussions with employers in the general region. According to the US Department of Labor over 500,000 professionals in fields ranging from environmental engineer to retail trade analysis are asked to use these methods in their jobs. The Bureau of Labor Statistics show that surveyors, cartographers, and photogrammetrists (a subset of GIS occupations) are experiencing faster than average employment growth – anticipating growth at 19 percent between 2008 and 2018. Further, the Bureau reports that there will be "much faster than average" growth, in excess of 20 percent or more, in jobs for geographers, geoscientists, cartographers, urban and regional planners, and other geographic professionals, with projected needs of upwards of 15,000 additional employees in each of these career fields between 2008–2018. *Money Magazine* and Payscale.com listed geographic information system analyst in its list of the "Top 100 Best Jobs in America" list of the "Best Jobs in Fast-Growth Fields" includes various careers that also utilize GIS – but where it is not the “prime” description. We have identified these in close consultation with companies and governmental and non-profit organizations deeply involved in geospatial applications. These include companies and organizations who are not only primarily focused in the geospatial arena (such as mapping companies and governmental agencies in mapping) but also companies in areas that use geospatial methods – such as energy, forestry, agribusinesses, logistics, retail and others in which employees with strong geospatial skills are very important to their success. We have also worked carefully to insure that our courses cover the key skills defined in the the U.S. Department of Labor’s Geospatial Technology Competency Model (GTCM).

As there are already a number of online programs across the US we spent considerable time meeting with and listing to employers in our service region. We have roughly defined that as shown in the graphic. In our discussions the employers indicated that they could meet the need for qualified GIS professionals but that the great majority of graduates did not have adequate preparation in computational skills and quantitative reasoning. As a result, we have structured our classes to provide the foundational skills and geospatial skills in a six course package with each course having three credits.

The six courses in the program are structured into **three foundational skills classes** and **three geospatial skills** classes. The foundational skills classes are: **GEOS 3003** *Geospatial Technologies Mathematical Toolkit* (3 credits), **GEOS 3103** *Geospatial Technologies Computational Toolkit*, and **GEOS 3563** *Geospatial Technologies Statistical Toolkit*. The three geospatial classes are **GEOS 3543** *Geospatial Applications and Information Science*, **GEOS 3553** *Spatial*

Analysis Using ArcGIS, **and GEOS 3593** *Introduction to Geodatabases*. We provide an option to test out of two of the foundational skills classes (GEOS 3003 and GEOS 3103) as many potential candidates may have already taken equivalent classes. The math, statistics and computational courses are unique in our knowledge as they are structured specifically around skills in this arena that have been defined as job critical. Each module in each of the foundational classes revolves around the math, statistics or computational skills NEEDED to perform, a common activity in the geospatial arena. In this way the fundamental math, statistics and computational skills are taught to the student in a motivated manner and after each module they come away with practical job-related skills.

The program was approved in 2014 by the Arkansas Department of Higher Education and was **the first undergraduate certificate** offered by the UA campus.

Faculty: Dr. Fred Limp serves and the program advisor and interacts with all applications. He teaches 3553 and co-teaches 3543 and 3593 with Dr. Xuan Shi. Dr. Shi teaches 3103. Dr. Jack Cothren teaches 3003 and 3563. Note that all teaching is done as "service" and offered above the instructor's standard classes instruction load.

Enrollment Results

We had 12 enrollees in 2014-15 and (to date) 19 for 2015-2016. We have one student complete the certificate program and a second will do so this semester. We received an unsolicited letter from the employer of Ms. Wyatt – our first certificate reception – the City of Fayetteville's GIS program. The author was Greg Mitchell, GIS Coordinator for the City of Fayetteville.

> "Katie Wyatt has been working here all week and is doing great. She caught on fast, asks good questions, and appears to be moving from the specific task we trained her on to understanding the more general concepts that will allow her to become even more valuable to us. …. thanks for sending her our way!
>
> **Also, I am impressed by her general GIS knowledge and skills – it seems your certificate course covered a lot of bases. In fact, I'm going to ask her for help on a Network Analyst problem I'm having trouble with! "**

Our second individual completing the Certificate is now employed as a geospatial technical engineer with the US Army.

Online certificate class enrollments were:

Class	Semester	Count
GEOS 3543 Geographic Information Science	Fall 2014	5
GEOS 3543 Geographic Information Science	Spring 2015	7
GEOS 3543 Geographic Information Science	Fall 2015	12

GEOS 3543 Geographic Information Science	Spring 2016	5
GEOS 3553 Geospatial Analysis Using ArcGIS	Fall 2014	NA
GEOS 3553 Geospatial Analysis Using ArcGIS	Spring 2015	3
GEOS 3553 Geospatial Analysis Using ArcGIS	Fall 2015	2
GEOS 3553 Geospatial Analysis Using ArcGIS	Spring 2016	3
GEOS 3003 Geospatial mathematical toolkit	Fall 2014	5
GEOS 3103 Geospatial computational toolkit	Fall 2014	3
GEOS 3103 Geospatial computational toolkit	Spring 2015	0
GEOS 3103 Geospatial computational toolkit	Fall 2015	3
GEOS 3103 Geospatial computational toolkit	Spring 2016	0
GEOS 3563 Geospatial statistical toolkit	Fall 2014	0
GEOS 3563 Geospatial statistical toolkit	Spring 2015	1
GEOS 3563 Geospatial statistical toolkit	Fall 2015	0
GEOS 3563 Geospatial statistical toolkit	Spring 2016	1
GEOS 3593 Introduction to geo-databases	Fall 2014	1
GEOS 3593 Introduction to geo-databases	Spring 2015	1
GEOS 3593 Introduction to geo-databases	Fall 2015	0
GEOS 3593 Introduction to geo-databases	Spring 2016	2
Total		**30**

Note than in a number of cases the online students were enrolled along with on-campus students in the same online class. Total enrollments are below.

Class	Term	Count
GEOS 3543 Geographic Information Science	Fall 2014	24
GEOS 3543 Geographic Information Science	Spring 2015	37
GEOS 3543 Geographic Information Science	Fall 2015	31
GEOS 3543 Geographic Information Science	Spring 2016	38
GEOS 3553 Geospatial Analysis Using ArcGIS	Fall 2014	7
GEOS 3553 Geospatial Analysis Using ArcGIS	Spring 2015	7
GEOS 3553 Geospatial Analysis Using ArcGIS	Fall 2015	6
GEOS 3553 Geospatial Analysis Using ArcGIS	Spring 2016	6
GEOS 3003 Geospatial mathematical toolkit	Fall 2014	8
GEOS 3103 Geospatial computational toolkit	Fall 2014	6
GEOS 3103 Geospatial computational toolkit	Spring 2015	6

GEOS 3103 Geospatial computational toolkit	Fall 2015	5
GEOS 3103 Geospatial computational toolkit	Spring 2016	2
GEOS 3563 Geospatial statistical toolkit	Fall 2014	1
GEOS 3563 Geospatial statistical toolkit	Spring 2015	4
GEOS 3563 Geospatial statistical toolkit	Fall 2015	1
GEOS 3563 Geospatial statistical toolkit	Spring 2016	1
GEOS 3593 Introduction to geo-databases	Fall 2014	2
GEOS 3593 Introduction to geo-databases	Spring 2015	3
GEOS 3593 Introduction to geo-databases	Spring 2016	2
Total		**236**

Major upgrade to program in Summer 2016

Enrollments have not been as substantial as the market analysis suggested and we have taken a number of steps to modify the program. One activity has been to "rebrand" the mathematical and statistical classes. Many students still appear to be reluctant to engage in math and statistics so we are rebranding the classes and further revising them. The math course (3003) will become *Foundations of Geospatial Data Analysis* and the statistics course (3563*)* will be *Geospatial Data Mining*. The content of the two will be revised as will that of 3103 – to focus even more directly on the job skills needed – using these as motivators for the basic math, statistical and computations skills that are covered.

It has also become clear that a major positioning for the certificate is at the graduate level – so we have submitted an application for a graduate version of the certificate – **GISTGC: Geospatial Technologies Graduate Certificate**. This has recently received final approval by ADHE and will begin in Fall 2016. Graduate versions of all classes have been developed. Efforts are currently underway to begin advertising for this new graduate certificate.

As part of the major "upgrade" to the certificate program in summer 2016 we will be working closely with the Global Campus staff in improving the structures in Blackboard, updating all video and graphic presentations and creating a common look and feel across classes.