Gainesville State College
Office of the President

Post Office Box 1358
Gainesville, Georgia 30503-1358

Phone (678)717-3610
FAX (678)717-3830

June 2, 2011

Dr. Linda Noble
Associate Vice Chancellor for Faculty Affairs
University System of Georgia
270 Washington Street, SW
Atlanta, GA 30334-1450

Dear Dr. Noble,

It is my pleasure and honor to write a letter of support for Gainesville State College's (GSC) Lewis F. Rogers Institute for Environmental Spatial Analysis (IESA) application for the Fiscal Year 2012 Regents' Teaching Excellence Awards Department/Program Award. This is an important initiative and award and our program at GSC has proven itself as a premier location for geospatial education. Gainesville State College's Institute of Environmental Spatial Analysis, a National Science Foundation Center of Excellence for Geo-spatial education offers Baccalaureate degrees in Applied Environmental Spatial Analysis (AESA) with concentrations in three areas: environmental science, environmental studies and information technology plus various certificate options. These programs have important strengths gained through a unique focus on applied geospatial skills delivered in a holistic and interdisciplinary format tailored to meet workforce needs.

Further, by coupling geo-spatial skills to the concentrations of environmental studies, environmental science and information technology, the educational experiences offered by GSC through the IESA provide students, educators, researchers and the public in general an opportunity to gain a holistic understanding of events and environment that range from regional to global in context.

Students seeking the AESA B.S. degree receive outstanding instruction from a knowledgeable and dedicated faculty. Students are often involved with service learning, have received numerous awards and significantly are involved with publication and presentation as undergraduates. Additionally, we are pleased and proud to report that graduates receive many opportunities for employment at high salaries and/or options to attend graduate schools.

Lastly, the educational opportunities offered through IESA are one of the showcase programs here at Gainesville State College and the Institute's application for the Regents' Teaching Excellence Award has my full support.

Sincerely,

Martha T. Nesbitt
President

EDUCATION IN GEOSPATIAL TECHNOLOGY

The Lewis F. Rogers
Institute for Environmental
and Spatial Analysis

3820 Mundy Mill Rd.
Oakwood, GA 30566

678.717.3666

www.gsc.edu/iesa

FACULTY

Environmental Science
Margi Flood
Tim Howell
Mary Mayhew
Jamie Mitchem
Katayoun Mobasher
Paula Nolibos
Sudhandshu Panda
Chris Semerjian
Jeff Turk

Environmental Studies
Allison Ainsworth
John O'Sullivan
Clay Ouzts
Kerry Stewart
Clayton Teem

Information Technology
Garfield Anderson
Charles Fowler
Paul Murray

Gainesville State College
University System of Georgia

The Institute for Environmental and Spatial Analysis (IESA) was formed at Gainesville State College in 2001.

The Institute is a collaborative effort of the Gainesville State College Division of Natural Sciences, Engineering, and Technology, Division of Social Sciences, and Division of Humanities and Fine Arts, North Georgia College and State University, and the University of Georgia.

MISSION

The Institute for Environmental and Spatial Analysis (IESA) is a teaching, research, and public service resource whose focus is the characterization and management of environmental concerns in Northeast Georgia. Specific actions within this broad mission include:

- developing programs to maintain and improve the environment in NE Georgia;
- giving individuals technical and conceptual tools to assess and manage environmental problems in watershed management, soil conservation, forestry, engineering, environmental policy, politics and law, health, communications, and society and the environment;
- providing opportunities for public education and professional training in environmental health, environmental communications, and social dimensions of environmental issues; and
- raising public awareness of the importance of environmental issues and the effects of land use changes and development on water quality, environmental health, environmental policies, and social issues involving environmental concerns.
- To provide training and educational programs and opportunities in the Geospatial Technologies.

(3) Certificates: Geographic Information Science, Environmental Science, and Environmental Studies
(3) B.S. Degrees: Environmental Science, Environmental Studies, and Information Technology

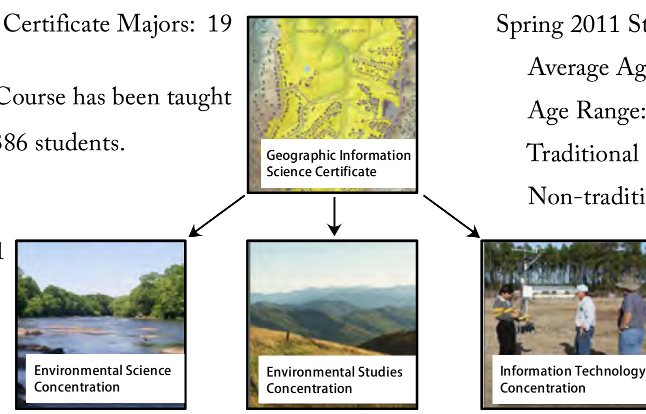
BACHELOR OF SCIENCE

Applied Environmental Spatial Analysis (AESA) Degree

Certificate Majors: 19

Intro to GIS Course has been taught 89 times to 1386 students.

AESA Majors: 81



Spring 2011 Students
- Average Age: 31
- Age Range: 18 - 60
- Traditional Students (< 30 yrs): 52
- Non-traditional: 48

Over 29 Undergraduate Student Presentations and Publications. • Over 7 Faculty Grants.

Contact Chris Semerjian csemerjian@gsc.edu

Narrative

Introduction: In 2001 The Lewis F. Rogers Institute for Environmental & Spatial Analysis (IESA) at Gainesville State College was established as an interdisciplinary teaching, research and public service resource for the North Georgia Region. The goals of the Institute are 1) to provide training and education in geospatial technology to address workforce needs as identified by the DOL and others, 2) to encourage interdisciplinary scholarship, and greater faculty involvement with service communities, and 3) to work collaboratively with local governments, school districts, professional organizations, industry, and state and federal agencies concerned with water quality to provide service & training that meet local environmental needs.

The Institute promotes environmental education through the use of advanced technology, interdisciplinary instruction, collaborative learning and service. The Institute brings together the perspectives of numerous disciplines through the synthesis of geospatial technology, applied, techniques, and theory to address social, human and environmental issues. Students, faculty and staff work together with industry, government and community partners through their coursework resulting in a dynamic and socially relevant learning environment. The following narrative will provide an overview of IESA's academic program and provide evidence of success in innovative teaching and learning through integration with the Department of Geospatial Sciences.

Program Structure: IESA offers its applied technical education at two levels. The first level and heart of the program is the Certificate in Geographic Information Science. Geographic Information Science involves the study and application of Geospatial Technology. Geospatial Technology includes any technology that collects, manages, analyzes or displays geographic information such as the Global Positioning System, Geographic Information Systems, and Remote Sensing from satellites. The Certificate in GIS is an 18 semester credit program to teach the fundamentals of the technology through applied projects. The Certificate can provide workforce skills as a standalone program or provide the technical foundation for entry into the second level of IESA education, the B.S. Degree in Applied Environmental Spatial Analysis (AESA).

The Certificate courses focus on developing the geospatial and technical skills to solve a variety of problems. The AESA B.S. courses build upon these technical skills for applications in specific disciplines such as hydrology, land use, environmental communications and many others. In addition to offering advanced geospatial technology courses, the AESA B.S. degree offers advanced instruction in three tracks, Environmental Science, Environmental Studies and Information Technology. Students select their primary focus in science, social science or technology while filling electives from the other two tracks. Each track provides the rigor and subject matter of a traditional degree but based upon a prerequisite of proficiency in the application of geospatial technology. This makes the AESA degree unique. It is not merely a collection of courses, but a synthesis of geospatial technology, science, social science, and information technology.

Specific program details can be found in *Appendix A.*

Teaching: Everything has a place. Geospatial technology manages information across space and is therefore an invaluable tool for exploratory and discovery-based learning in most disciplines. It allows the inclusion of a variety of perspectives when analyzing problems, many of which may lie outside of the discipline of a particular course. All courses within the Certificate and the B.S. degree require a significant final project, selected in consultation with the instructor. Commonly the instructing faculty member and/or student must consult with faculty from other departments or courses. Routinely these projects address a real-world community need and include an outside partner. As the end of the semester nears, lines between classes and instructors blur, resulting in a truly dynamic learning environment which often advances the knowledge of both the faculty member and student. This in turn advances the curriculum. Along with other initiatives discussed in the following sections, this keeps teaching at the cutting edge of the geospatial technology field. Rubrics are used to assess student performance in all courses relative to program-specific student learning outcomes. Each faculty member also utilizes the rubrics to assess the student's final project. Faculty to student ratios are excellent with class sizes averaging below 12 students. In addition, all geospatial faculty are encouraged to participate in grant work as long as it provides students with an educational experience in line with departmental goals. At any one time the Department is working on numerous student-based grants which is highly unusual for an undergraduate program.

A list of selected student projects and publications is listed in *Appendix B.* A list of selected faculty grants with student involvement is listed in *Appendix C.*

Teaching that extends beyond the classroom: Students require constant access to the software and hardware. To ensure that they are receiving continued access to resources and the most up-to-date technical instruction possible, the Geospatial Department worked closely with the IT department to create the GIS Virtual Lab. This allows 24-7 virtual remote desktop access to all geospatial software, data and storage. This technology, which is also used by the rest of the campus, has resulted in increased productivity from students and easier management of projects. One significant spinoff of the GIS Virtual Lab has been the ability to teach GIS off-campus. Through the virtual lab, instructors and students have been able to work with local school systems to introduce Geospatial Technology. With help from Gainesville State College, middle school students from the Da Vinci Academy in Hall County log into the virtual lab to work on projects related to their coursework. A significant outcome was the submission of 13 projects from the Hall County School System to the Georgia Urban and Regional Information Systems Association Student Achievement Award. Georgia URISA is the state geospatial professional's organization. Through the GIS Virtual Lab outreach, the organization received their first ever project submissions from K-12 institutions. Hall County middle school students took 1st and 2nd place prizes for 2009 and 2010. The virtual lab is being explored as a way to engage more public schools in geospatial technology.

Statistics on virtual lab use and a list of middle school geospatial projects can be found in *Appendix D.*

Currency of the Curricula: The foundation for both the Certificate and the AESA degree is geospatial technology. As with any cutting edge technology the industry is constantly changing. Two ongoing data-driven approaches have been used to ensure that curricula keep up with the industry. In January of 2009, Gainesville State College, as part of the National Geospatial Technology Center, conducted a DACUM for the occupation of geospatial technician in the Metro-Atlanta area. A DACUM is an acronym for Developing A Curriculum. It is an occupational analysis method to determine the skill sets needed to perform in a particular occupation. Twelve geospatial professionals gathered over two days to capture and categorize the tasks and skills needed to perform in this job. The results were validated and ranked through 200 geospatial professionals within the state of Georgia. In the spring of 2009, the validated results were cross-referenced with subjects being taught within geospatial courses within IESA. A surprising 80% overlap was found. Relevant skills and tasks not addressed in the curricula were added in appropriate classes beginning Fall semester 2009. One new course, Seminar in Geospatial Technology, was added to address skills and knowledge that did not fit into other courses. Results from the Metro-Atlanta DACUM can be found in *Appendix E* along with a matrix cross-referenced to IESA's core geospatial courses.

Geospatial Technology was identified in 2003 as one of 14 high-growth, economically vital industry sectors in President George Bush's "High Growth Job Training Initiative". In June of 2010 the United States Department of Labor Employment Training Administration (DOLETA), after more than $8 million of investment, published the Geospatial Technology Competency Model (GTCM). One of only 17 competency models published by the DOL, the document is a comprehensive industry model that documents the foundational and technical skills and competencies required for workplace success in the geospatial industry. The GTCM provides a resource for the development of curriculum. During the Fall of 2010, the College created a GTCM Program Assessment Tool. This allowed the comparison of skills and knowledge taught in the program to the GTCM and at what level. The results indicated that GSC's core GIS courses covered approximately 93% of the DOL model. A summary of assessment can be found in *Appendix F*.

Currently the College is aggregating the results from the Atlanta geospatial DACUM and the GTCM to produce a comprehensive assessment tool for geospatial course and program evaluation which will not only address *if* a competency is taught but also at what level. This tool, which will be useful for programs across the nation, will be completed during the fall of 2011.

Recruitment and Retention: One of the biggest concerns of a geospatial program is recruitment. Several strategies are used to maintain a flow of students into the program. Guest lectures and class visits to students both on and off campus illustrating the usefulness, application, relevance, and "coolness" of the technology continuously prove to draw students into the program. The single most important recruitment tool, however, is the Introduction to Geographic Information Science course. Although geospatial technology is relevant to most if not all subjects, many of these disciplines and instructors have yet to embrace it and many might never have heard of it. To address this problem, the College sought and received approval to offer the interdisciplinary introductory course as an elective in the Math, Science and Technology area of the core curriculum (Area D). Multiple sections offered at strategic times each semester attract students who need an elective but have run out of familiar choices. These students combined with those who take the course because they are genuinely interested in the subject account for about 30% of each introductory class that elects to continue with the program. Another strategy utilized to recruit and retain students is by offering the GIS Certificate at night. Many students work full time and desire the Certificate to increase their job skills and marketability. Advising is arguably one of the most important aspects of the program. Although all faculty members serve as advisors, two senior faculty advisors have been designated to ensure that proper courses and sequences are taken. Each student in the program must visit with the senior advisors once per semester to update their folders.

The growth of the introductory class and geospatial program can be found in *Appendix G*.

External Recognition: IESA and the Geospatial Department participate with many external organizations, regional and national. Faculty, staff and students sit on a variety of committees including the education committees for the Georgia Urban & Regional Information Systems Association and the Georgia GIS Coordinating Committee. IESA maintains partnerships with the United States Forest Service Chattahoochee-Oconee National Forest Office, the United States Army Corps of Engineers Buford Office, and the University System of Georgia Health Workforce Center to provide student-based geospatial services. IESA works closely with the Georgia Institute of Technology Center for GIS, Middle Georgia College, Ogeechee Technical College, and Central Georgia Technical College to work towards seamless geospatial education in the state of Georgia. IESA maintains up to five contracts per year on an ongoing basis from a variety of agencies and institutions within the region and state. In 1998, the GIS program was awarded the TERIFFIC award from the Georgia Economic Developer's Association. IESA represents the southeastern United States as a senior partner in the National Geospatial Technology Center, funded by the National Science Foundation. This is the result of work on 4 prior NSF funded initiatives. The IESA is also an official member of GeorgiaView which is part of AmericaView, a nationwide initiative by the United States Geologic Survey to distribute satellite imagery and remotely sensed data.

Measure of Quality: The geospatial program is assessed annually using a set of indicators that define quality, productivity, and viability within a full Comprehensive Program Review conducted every seven years. Through annual reports, each program reports on their use of data to improve the program as well student learning. Arguably**,** the ultimate measure of success of an academic program is student achievement. The Geospatial program boasts an excellent retention rate, job placement rate and graduate transfer rate. Over 86% of students who enter the certificate and 85% who pursue the AESA degree complete the programs. While tracking is incomplete for our early certificate students, job placement rates have been excellent for these students, estimated at over 80% overall and over 90% for those who sought work. Eighty-two percent of graduates from the AESA B.S. degree have either obtained employment or have been accepted to graduate schools. This is significant considering the state of the economy since the first AESA graduates were produced in 2008. The remaining 6 students are currently seeking employment or were not able to be located.

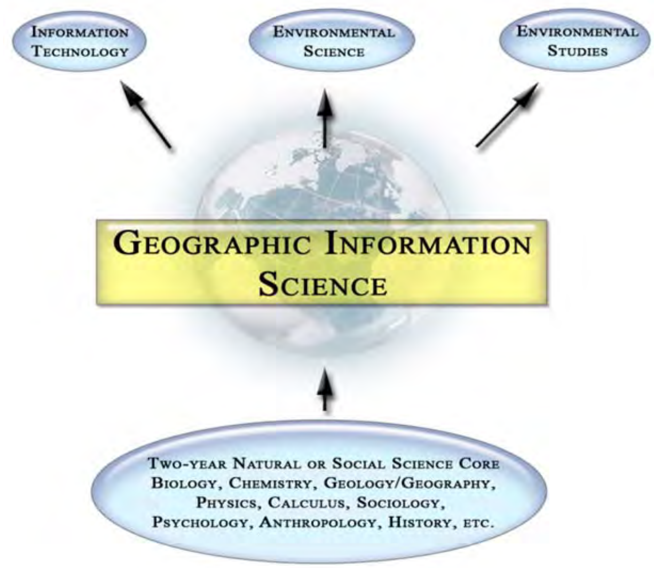
Overviews of student placement for the AESA degree and student achievement awards can be found in *Appendix H*. Graduation rates can also be found in *Appendix G*.

Appendix A – AESA Geospatial Curricula

1) Structure of the B.S. Degree in Applied Environmental Spatial Analysis.

Major Tracks (geospatially based)

Certificate in GIS
(stand-alone or year 3 in degree)



2) Required major course work for AESA degree. (Science track shown)

Required Geographic Information Science (22 HOURS)

GISC 3011K - Fundamentals of Cartography and Earth Measurement
GISC 4011K - Data Acquisition & Conversion
GISC 4350K - Fundamentals of Remote Sensing
GISC 4360K - Digital Image Processing
GISC 4470K - Spatial Analysis in GIS
GISC 4500K - Application Development in GIS
GISC 4600K - Watershed Characterization

Required Upper-division Science w/GIS applications (26 HOURS)

BIOL 3325K - Invertebrate Zoology
ESCI 3001K - Land Use and Conservation
ESCI 3003K - Fundamentals of Soil Science
ESCI 4001K - Ecology of Wetlands and Streams
ESCI 4002K - Limnology
ESCI 4003K - Hydrology
ESCI 4010K - Environmental Chemistry

Appendix B - List of Selected Undergraduate Student Presentations and Publications

Student names are underlined in bold type.

Peer Reviewed Proceedings

1. Panda, S.S.,**J. Martin**, and G. Hoogenboom, 2011. Blueberry Crop Growth Analysis Using Climatologic Factors and Multi-temporal Remotely Sensed Imageries. Accepted for Peer Reviewed Proceedings of 2011 Georgia Water Resources Conference, Athens, GA.
2. **Nesbitt, J.** and S. S. Panda, 2011. Cotton Crop Rotation Suitability Analysis for Southwest Georgia Using Geospatial Technology. Accepted for Peer Reviewed Proceedings of 2011 Georgia Water Resources Conference, Athens, GA .
3. **Fitzgerald, J.**and S. S. Panda, 2011. Engineering-based New Reservoir Design and Environmental Suitability Analysis with Geospatial Technology. Accepted for Peer Reviewed Proceedings of 2011 Georgia Water Resources Conference, Athens, GA .
4. **Strother, C.**and S. S. Panda, 2011. Soil Moisture and Peanut Crop Yield Correlation Study in Georgia with Two Contrasting Precipitation Years. Accepted for Peer Reviewed Proceedings of 2011 Georgia Water Resources Conference, Athens, GA .
5. Panda, S.S. and **H. J. Byrd**, 2009. Geo-spatial model development for 12-digit HUC based NPS pollution prioritization mapping for Fannin County, GA. Peer Reviewed Proceedings of 2009 Georgia Water Resources Conference, Ed. Denise Carroll, pp 434 – 443.
6. **Kraemer, C.**and S. S. Panda, 2009. Automated geo-spatial ArcHydro type model development for watershed delineation. Peer Reviewed Proceedings of 2009 Georgia Water Resources Conference, Ed. Denise Carroll, pp 428 – 433.
7. **Skelton, S.**and S. S. Panda, 2009. Geo-spatial technology use to model flooding potential in Chestatee River Watershed. Peer Reviewed Proceedings of 2009 Georgia Water Resources Conference, Ed. Denise Carroll, pp 410 – 417.

Peer Reviewed Journals Papers

1. Panda, S. S.,**J. Reed**, J. Paz, and G. Hoogenboom, 2010. A suitability analysis model for determining potential locations for blueberry production in Georgia using geospatial technology. Photogrammetric Engineering and Remote Sensing (*In Review*).
2.

Technical Paper Presentations

1. **Fitzgerald, J**.and S.S.Panda, 2011. Multi-temporal land use change analysis of the Alcovy watershed for prudent environmental management decision support. Georgia Academy of Science Conference 2011, Gainesville, GA.
2. **Hale, J.D.**and S.S.Panda, 2011. Multi-temporal land use change analysis of Oconee County, GA for development support and land management. Georgia Academy of Science Conference 2011, Gainesville, GA.
3. **Phillips, Z.,**S.S.Panda,and Sharma, J.B., 2011. Analysis of multi-temporal land use change in Jones County, Georgia for proper land-use planning decisionmaking. Georgia Academy of Science Conference 2011, Gainesville, GA.
4. **Fitzgerald, J**.and S.S.Panda, 2010. Reservoir suitability design and runoff estimation using SCS method. 2010 Geospatial Conference, October 19-22, 2010, Athens, GA. (Awarded first prize in undergraduate level best paper category.)
5. **Burry, K., J. Lipscomb**, and S.S.Panda, 2010. Development of automated geospatial model to determine the demise of a small wetland in Flowery Branch. Georgia Urban and Regional

Information Systems Association (GA-URISA), Atlanta, GA. (Awarded first prize in undergraduate level best paper category.)

6. Panda, S.S. and **Dalton, K**., 2010. Development of an automated watershed stream health determination model using the 12-point physical watershed parameters. National Water Conference 2010, February 21-25, 2010, Hilton Head, SC.
7. **Taylor, P.** and S.S.Panda, 2009. SQL and ArcIMS server development. SQL Saturday Conference, October 10, 2009, Gainesville, Georgia.
8. **Reed, J.**and S.S.Panda, 2009. A suitability analysis model for potential blueberry production in Georgia using geospatial technology. Georgia Academy of Science Conference 2009, Atlanta, GA.
9. **Dalton, K.**and S.S.Panda, 2009. Dam breaks scenario modeling with HAZUS-MH software. Georgia Academy of Science Conference 2009, Atlanta, GA.
10. **Sean, F**.and S.S.Panda, 2009. Geospatial technology usage to analyze environmental and socioeconomic impacts on coastal resources in southwestern Madagascar. Georgia and Florida Academy of Science Conference 2009, Atlanta, GA.
11. Panda, S.S.and **R. Randall**, 2009. Geospatial model development for watershed based fecal coliform estimation and comparison with Virginia Tech's bacteria loading calculator. CSREES National Water Conference, February 8 – 12, 2009, St. Louis, Missouri.
12. Panda, S.S. and **J. Proctor.** 2008. Impact of LULC, DEM, and soil resolution and temporal changes on the watershed related output estimation. Joint Annual Meeting of the Georgia Chapters of Soil & Water Conservation Society (SWCS), American Society of Agricultural & Biological Engineers (ASABE), and Southeast Chapter of International Erosion Control Association (IECA), 2008, Athens, GA.
13. **Lance, L**. and S.S.Panda, 2008. Delineation of cougar habitat in Appalachian mountain range in Georgia with geospatial modeling. Georgia and Florida Academy of Science Conference 2008, Jacksonville, Florida. (Awarded first prize in best paper category.)

Technical Poster Presentations

1. Panda, S.S., **Peters, P., Harris, R. andSkarda, R.J**., 2011. Remote measurement of potential water loss through evapo-transpiration of kudzu during the growing season. National Water Conference 2011, January 31-February 1, 2011, Washington, DC.
2. **Robertson, K**.,and S.S.Panda., 2010. Analysis and Comparison of SSURGO and STATSGO Soil Data with the Development of a Geospatial Erosion Model. National Water Conference 2010, Hilton Head, SC.

Other Invited Presentations

1. **Martin, J**.,May2010. Watershed modeling in Turkey Creek watershed using SWAT. Presented in the Center for Forested Wetlands Research, USDA Forestry Service, Cordesville, SC.
2. **Martin, J.,**April 2011. Turkey Creek watershed decision support using geospatial technology. Presented in School f Charleston, Charleston, SC.

Published Decision Support Systems (DSS) and Project Web Sites

1. Watershed Assessment Tools for Extension & Research (WATER) web site (Created with ASP.Net): http://web.gsc.edu/gis/water/. Student Contributors: **J. Bless**, **P. Taylor**, and **J. Miller**.
2. West Fork Little River Watershed GIS-based Decision Support System Development site (Created in Dreamweaver and JavaScript): http://web.gsc.edu/gis/gp/.Student Contributors: **A. Mason**, **B. Avant**, **N. Garland**, and**K. Burry**.
3. Gwinnet Technical College Tree Finder webGIS site (ArcIMS Site): http://gisweb.gsc.edu/website/Gwinnett_Tech_Tree_Finder/viewer.htm. Student Contributor: **P. Taylor**.

Appendix C – Selected Faculty Grants

a. *National Geospatial Technology Center* (2008 – 2012, Davis (PI), Semerjian (Co-PI)), National Science Foundation ATE grant to increase capacity of the geospatial workforce in the United States., $5 million ($360,000 GSC)

b. *GeorgiaView* (2004 – present, Sharma). J.B. Sharma has guided interns in projects that use satellite and airplane imagery to fulfill needs in our service area and or greater region. This includes land cover maps derived from multispectral imagery for several Georgia Counties and towns; a remote sensing camp for middle school children and digital restoration/geo-coding of historic air photos; conducted several remote sensing workshops for US Forest Service personnel and Extension Agents; developed geospatial products for US Army Corps of Engineers and Hall County NRCS.
    i. $2,000 anticipated to begin the 1974 Hall County Historical Photo Project (2010)
    ii. $2,500 to complete the 1955 Hall County Historical Photo Project (2008-09)
    iii. $1,700 to scan photos for the 1955 Hall County Historial Photo Project. The Hall County Soil Board contributed and additional $2,000 (2006-08);

c. *Watershed DDS Practicum Development* (2009, S. Panda, PI), Georgia Power, $25,000;

d. *Watershed assessment tools for extension and research training project*. (2009, S. Panda, PI) USDA-CSREES project: $40,000.

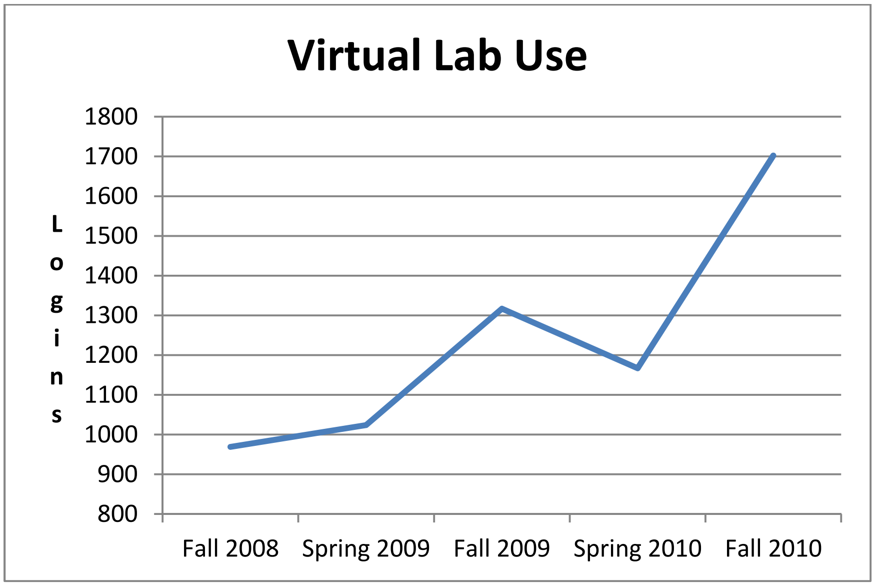
e. *Review and analysis of Hall County recycling program using survey and geospatial technology* (2009, S. Panda, PI). Hall County, GA project, $3,700.

f. *Science of the Georgia Barrier Islands* (2008-2009, Thomas, Semerjian, Hamilton), University of Georgia Teacher Quality Grant to provide field experiences for 5th grade teachers on Ossabaw Island, Georgia, $27,632

g. *Exploring the use of remote sensing for spatial data analysis of blueberry bushes*. 2008- 2009, S. Panda, Co-PI), National Aeronautics and Space Administration (NASA) project, $18,685 + $18,685

Appendix D – Virtual Lab Statistics

1. Increase in the use of the Virtual Lab since the Fall of 2008.



2. Student Survey of Virtual Lab Use (First 13 responses of 99; remaining are positive)

ID	How often do you login each week?	How has the Virtual Lab impacted your academic learning?
1	6-9	Greatly. I Live in Athens and am getting close to graduating with the AESA GIS/IT degree. It certainly would not have been possible without the virtual lab. In fact, I am most productive when working from home on the virtual lab.
2	6-9	I have access to everything that I need in order to fulfill the requirements of my classes at home. I am able to do my work, save it to my computer, and email it to myself. It would be extremely hard for me since I don't have access to Microsoft Word and all of its components at home. I love the Virtual Lab!
3	6-9	As an instructor I can get to data and infomation and keep it all in one place. It allows me to work from home but with the results of being in my office.
4	6-9	It's really has helped it makes it simple to get to all of my school work and not have problems b/c my computer not set up right. It's also nice to be able to have the new version of microsoft were ever i go and on any computer. I would not have been able to do some of my school work if it was not for Vlab! It's been a life saver many times!
5	6-9	Virtual Lab has been an invaluable tool in my learning. It has allowed me to balance my academic and work responsibilities.

6	1-5	It's important to my teaching because it makes software available to use in preparing materials for class that might otherwise not be available because of costs. It also makes software available to students to do their assignments that they might not be able to afford. I hope to use the function that allows me to print to campus computers from home in the future (as soon as I figure out how to do this [smile]). As a faculty member, it allows me to access webpages and sites that are only available from campus computers--which is very important for me. I live about 60 miles from the campus; and, it would have been a hardship (gas for a trip cost about $30) for me to come to campus just to access an on-campus computer. The convenience of accessing a campus desktop from anywhere makes my job easier; and, makes it possible to complete required activities online that might otherwise require my physical presence. Thanks for your support.
7	10+	The Virtual Lab is wonderful. It is so simple to use and it enables me to log onto Elearning from home. Because it is so convenient and user friendly, I've not had to purchase a laptop with all the programs I have access to through the VLab. In short, it makes it easier for me to present high-quality work for all my projects and assignments by using the programs that otherwise would be difficult for me to have access to.
8	1-5	It has greatly helped me, saving me money on software and allowing me quick transfer between my computer and the schools.
9		It is vital. I do not have access to software programs that are necessary to complete assignments. With Virutal Lab that problem is solved. There is no inconvenience of keeping up with a portable memory because I can save all information in the home folder and access it at school and at home.
10	Not often	Access to class folders or study materials distrubuted by teachers
11	1-5	I am now able to access the virtual lab. My former computer was not capable of receiving the information. I appreciate the lab. I can now do my homework from home instead of driving to the campus. I work three jobs so I do not have much opportunity to drive extra trips to campus. Thank you for making life easier for students and especially non- traditional students. The lab saves me time and gas money while still achieving my education. Thank you.
12	1-5	I am able to complete homework assignments instead of having to drive 30 miles to campus. I also do not have Microsoft Office 2007 on any of my computers and much of my assignments are typed with Word. The virtual lab gives me the opportunity to type all of my assignments.
13	Not often	The useability of the GIS Virtual Lab has improved since I began the program. I have little trouble doing work with the ArcMap suite of programs, however, I avoid doing complex raster work and plan to do it on campus only.

3. Hall County Middle School student geospatial awards as a result of Virtual Lab deployment

Georgia Urban and Regional Information Systems Association Thomas Metille Student Achievement Awards (first instance of K12 awards in Georgia)

2010 Awards

1st Place --certificate presented at award ceremony
Cody Brown | K12 (6th grade) | *Wireless Distance*

2nd Place --certificate presented at award ceremony
Samantha Alverson | K12 (8th grade) | *Tornadoes Hit Georgia*

Certificates of Merit -- to be mailed to the school
Trey Horton | K12 (7th grade) | *Death Penalty and 1st Degree Murder Rates*
Cody Brown | K12 (6th grade) | *Wireless Distance*
Braden Parks | K12 (6th grade) | *A Suspicious Package*
Jarrett Turner | K12 (7th grade) | *Sports Page Locations, Gainesville Times*
Jason Hwang | K12 (7th grade) | *Nuclear Facilities on the East Coast*
Seth Gaines K12 (8th grade) | *Sherman's March to the Sea*
Aajehla Sijiye | K12 (8th grade) | *Major Civil War Battles in Georgia*
Phouc Nguyen | K12 | (8th grade) | *Georgia's Major Airports*
Jordan Moore | K12 (8th grade) | *Martin L. King, Jr., Moments in History*
Chandler McCullough | K12 (8th grade) | *Civil Rights Movement During the 1900's*

2009 Awards

1st Place --certificate presented at award ceremony
Logan Allen for CRCT score mapping

2nd Place --certificate presented at award ceremony
Chad Newstrom for Population and Services Map of Georgia

Appendix E – Alignment of Geospatial Curricula to Industry through DACUM Analysis

1) Excerpt from the Developing a Curriculum Validation Survey for Geospatial Technicians. Performed by Gainesville State College and the National Geospatial Technology Center. January 2009. (Top 10 ranked tasks of 60 shown).

Gainesville State College, GIS Technician - Task Verification Survey			
SUMMARY TASK RANKING (Higher ranking tasks should be included in the curriculum)			
	TASK RANKING		
Task	**Importance (1-3)**	**Learning Difficulty (1-3)**	**Combined Total**
D-14 Evaluate spatial data accuracy	2.49	2.11	**4.60**
D-7 Perform data conversions	2.48	1.99	**4.47**
D-1 Post process GPS data (e.g. differential correction)	2.46	2.01	**4.47**
H-3 Obtain professional certification (e.g. GISP, ASPRS)	2.11	2.35	**4.46**
D-11 Derive new data (e.g. generate contours from DEM, data generalization)	2.20	2.24	**4.44**
D-2 Define data's spatial reference	2.61	1.83	**4.44**
D-8 Georeference data	2.54	1.88	**4.42**
D-16 Validate spatial data (e.g. topology, build, verification)	2.45	1.97	**4.42**
D-3 Change data's spatial reference	2.55	1.83	**4.38**
C-2 Identify data sources / resources	2.50	1.88	**4.38**

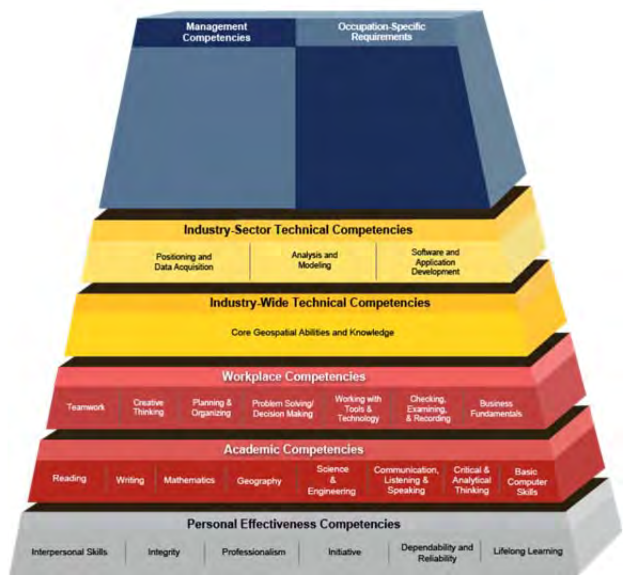
2) Matching of most important ranked DACUM tasks to GSC GIS certificate curricula in 2009. Items bolded and underlined indicate missing items that were subsequently added.

Course	**DACUM Task Items**
Intro to GIS	C-2, C-4, D-4, D-9, D-11, D-12, G-4
Cartography	C-2, D-2, D-3, E-4, G-1, G-2, G-4
Data Acquisition & Conversion	**<u>C-5</u>**, **<u>C-6</u>**, C-7, C-8, D-1, **<u>D-5</u>**, D-7, D-8, **<u>D-10</u>**, D-12, D-13, **<u>D-15</u>**, D-16, E-1, E-3, **<u>E-6</u>**, E-7
Spatial Analysis	D-13, D-11, D-14, E-4, E-5, E-7, F-5, F-6, F-9, G-3, G-4
Remote Sensing	A-3, C-2, D-8, D-11, G-4
Special Topics	A-3, A-4, C-3
<u>Seminar in GST</u>	**<u>B-1</u>**, **<u>B-3</u>**, **<u>B-4</u>**, **<u>H-1</u>**, **<u>H-2</u>**, **<u>H-4</u>**, **<u>H-13</u>**

Appendix F – Alignment of Curricula with the U.S. Department of Labor

1) The Geospatial Technology Competency Model is based upon eight tiers.

- **Occupation Related**
  - **Tier 8 -- Management Competencies**
  - **Tier 7 -- Occupation-Specific Requirements**
  - **Tier 6 -- Occupation-Specific Technical Competencies**
- **Industry Related**
  - **Tier 5 -- Industry-Specific Technical Competencies**
  - **Tier 4 -- Industry-Wide Technical Competencies**
- **Foundational Competencies**
  - **Tier 3 -- Workplace Competencies**
  - **Tier 2 -- Academic Competencies**
  - **Tier 1 -- Personal Effectiveness**

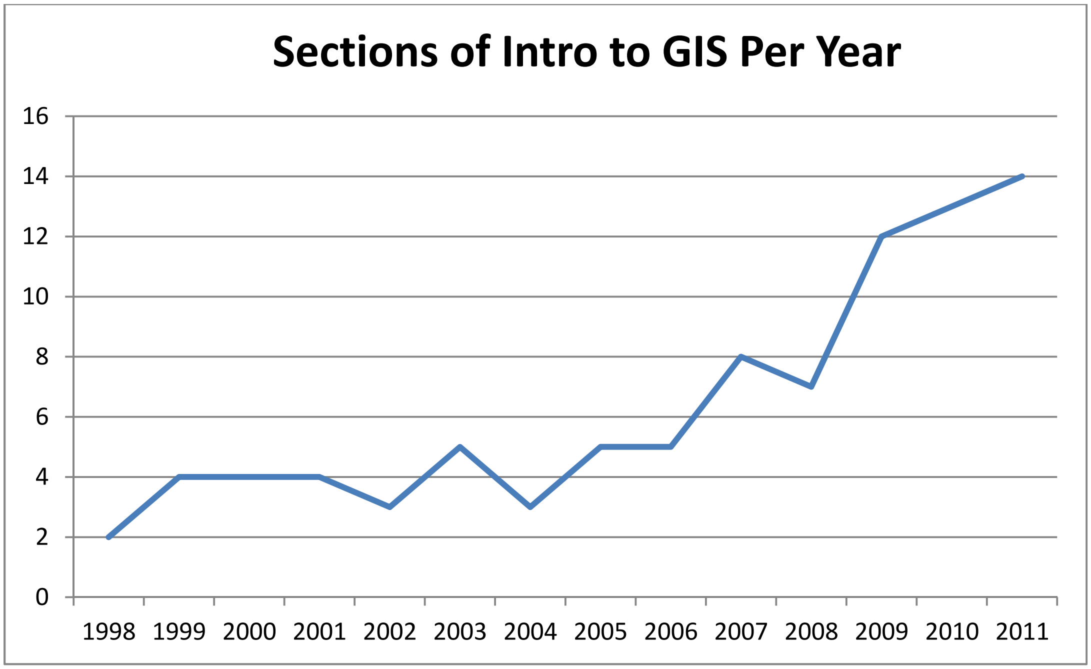


2) Competencies from Tiers 1 through 5 (geospatial industry) were placed into an excel spreadsheet and ranked from one to five based upon Bloom's Taxonomy of Learning Domains. An excerpt from the GSC GIS Certificate analysis is shown below. The *Percent of Competencies Addressed* is shown on the spreadsheet. Overall the certificate addresses 93% of GTCM competencies.

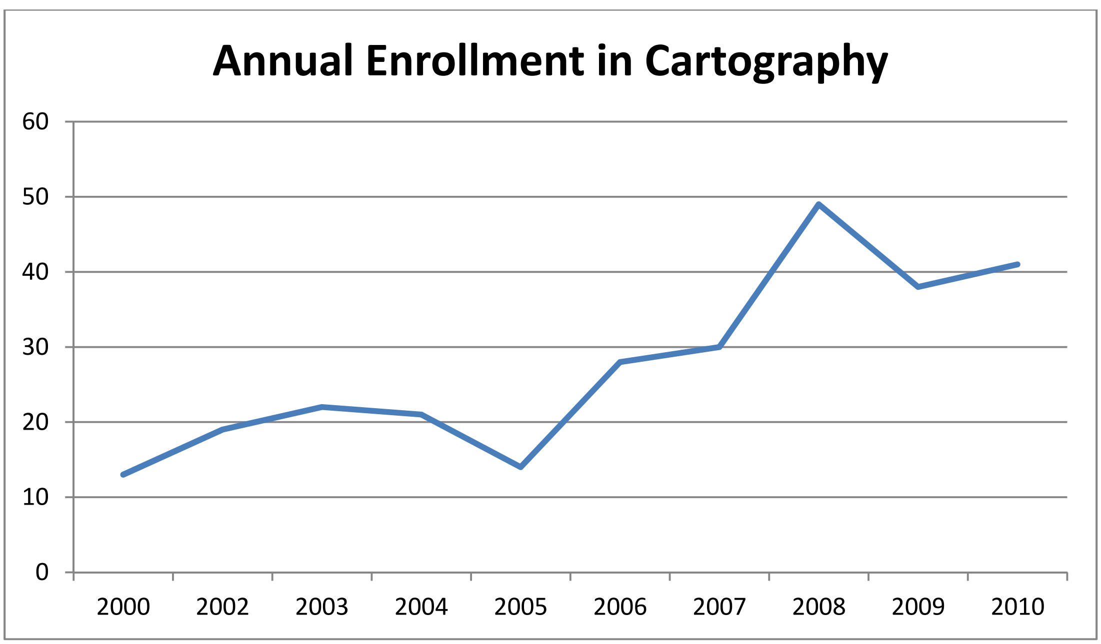
	A–C	D	E	F	G	H	I	J	K
1	GeoTech GTCM Assessment Worksheet								
2	Go to the GTMC Competency Model								
3	Enter course name(s) in the columns to the right; cut/paste for additional columns or delete as needed.								
4	Enter 1 through 5 indicating the highest level in which your course addresses each competency.								
5	Refer to the "Definitions" tab in this worksheet for explanation of mastery levels 1-5								
6	○ 1 No Awareness								
7	◔ 2 Awareness/Knowledge								
8	◑ 3 Comprehension/Application								
9	◕ 4 Analysis								
10	● 5 Synthesis/Evaluation	Intro to GIS	Cartography	Data Acquisition	Remote Sensing	Spatial Analysis	Internship	Average	Alignment w/GTCM
11	Average score per course	2.27	1.69	2.04	2.49	2.21	2.21	2.15	
12	% of competencies addressed	72.2%	37.3%	53.2%	79.2%	51.4%	67.3%	60.1%	93.3%
13	Tier 1 - Personal Effectiveness Competencies								
14	1. **Interpersonal Skills**: Demonstrating the ability to work effectively with others.	◑ 3	◔ 2	◑ 3	◑ 3	◑ 3	◕ 4	3.00	
15	2. **Integrity:** Displaying accepted social and work behaviors.	◑ 3	◔ 2	◑ 3	◑ 3	◑ 3	● 5	3.17	
16	3. **Professionalism**: Demonstrating commitment to the values, standards of conduct, and well being of one's profession.	◑ 3	◔ 2	◑ 3	◑ 3	◑ 3	● 5	3.17	
17	4. **Initiative:** Demonstrating gumption at work.	◔ 2	◔ 2	◑ 3	◑ 3	◑ 3	◕ 4	2.83	
18	5. **Dependability and Reliability**: Displaying responsible behaviors at work.	◔ 2	◔ 2	◔ 2	◔ 2	◔ 2	● 5	2.50	
19	6. **Lifelong Learning**: Displaying a willingness to learn and apply new knowledge and skills.	◑ 3	◔ 2	◑ 3	◔ 2	◑ 3	◕ 4	2.83	
20	Tier 2 - Academic Competencies								
21	1. **Reading**: Understanding written sentences and paragraphs in work-related documents.	◔ 2	◔ 2	◑ 3	◕ 4	◕ 4	◑ 3	3.00	
22	2. **Writing**: Using standard English to create work-related documents.	◔ 2	◔ 2	◑ 3	◕ 4	◕ 4	◕ 4	3.17	
23	**Organization and Development**	◔ 2	○ 1	◑ 3	◕ 4	◑ 3	◔ 2	2.50	
24	**Mechanics**	◔ 2	○ 1	◑ 3	◕ 4	◑ 3	◔ 2	2.50	
25	3. **Mathematics**: Using the principles of mathematics to solve problems.	◑ 3	◕ 4	◑ 3	◕ 4	● 5	◔ 2	3.50	
26	Number Systems and Relationships - whole numbers, decimals, fractions, and percentages	◕ 4	◑ 3	◕ 4	◕ 4	● 5	○ 1	3.50	

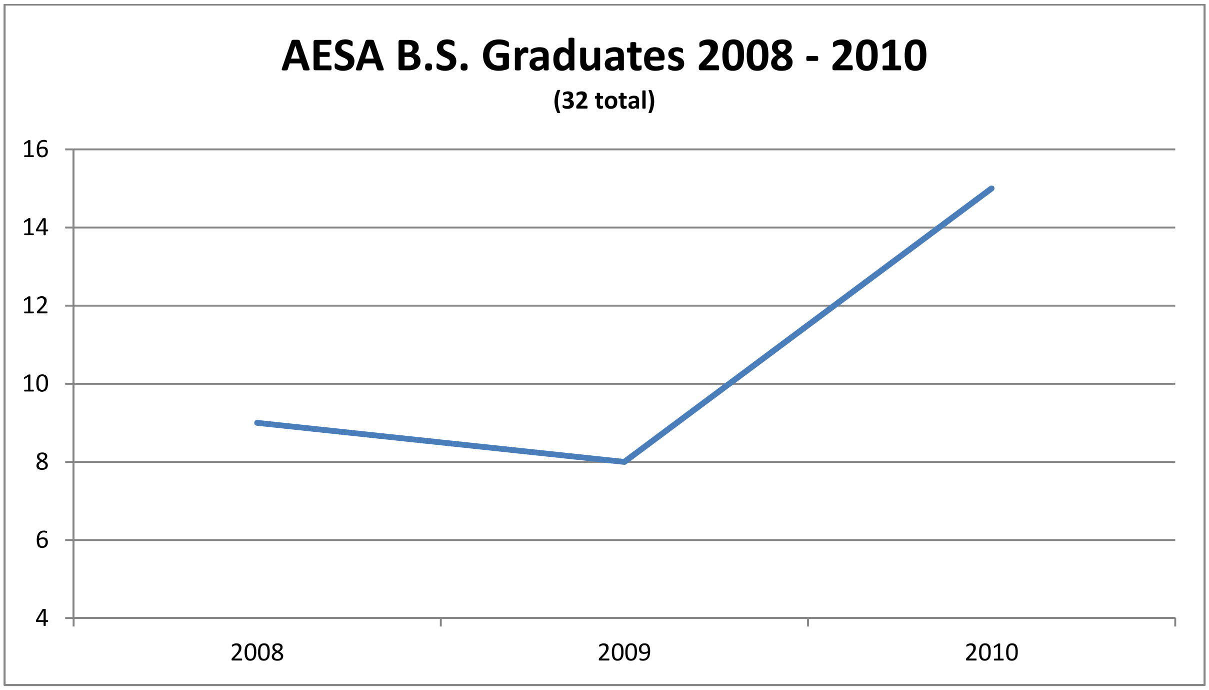
Appendix G – Growth of the Geospatial Program

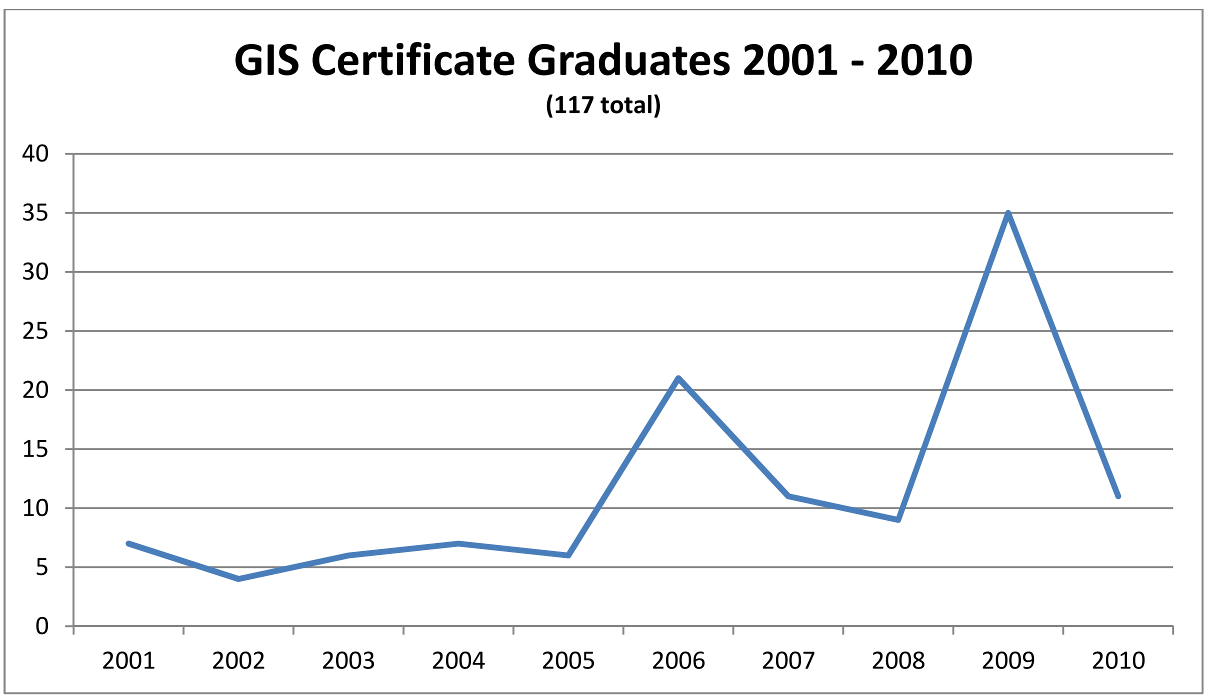
The Introduction to GIS is a general education course and is the feeder course for both the Certificate in GIS and the AESA B.S. Degree. A total of 1386 students have been impacted. Of these students, 311 or 22% have continued on the Cartography, a requirement for both programs.



Enrollment in Cartography, the 2nd course in both programs is an indicator of intent to pursue either the Certificate or B.S. Degree.







Note: The apparent downturn in the GIS Certificate for 2010 is attributed to a larger number of students taking geospatial courses as part of the AESA B.S. degree instead of the Certificate.

Appendix H – Student Success

1. List of Applied Environmental Spatial Analysis graduates who obtained graduate positions or employment in field. This represents 82% of graduates. The remaining 6 graduates are either seeking employment or could not be located.

Name	**Attainment**
Christopher Strother	UGA Geography, Masters
Timothy Gaunt	Jackson County Public Utilities, GIS
Avant, Brian Keith	UGA Warnell School of Forest Resources, Masters
Davis, Denise P	Atlantic Engineering Group
Jaume, Alex J.	United States Forestry Service, GIS
Peters, Pauline J	Part-time contract work, GIS
Kim, Yea Ji	Computer Analyst, Seoul, South Korea
Adams, Michael	AGL Resources, GIS Technician Contractor
Siso, Adam	USGS, GS-5 Scientist
Devries, Terah	City of Gainesville, GIS Analyst
Garland, Noel	Clemson University, Hydrology Masters
Mason, Ashley	Mississippi State University, Masters
Nesbitt, John David	Mississippi State University, Masters
Robertson, Kristina	Clemson University, Engineering Masters
Joe D'Angelo	Auburn University, Forest & Wetland Hydrology Masters
Sarah Skelton	UGA, Natural Resource Recreation & Tourism Masters
Steven Henning	United State Army Corps of Engineers, GIS Technician
Kyle Dalton	UGA Geography, PhD., Texas A & M, Masters
Brian Jacobson	Plum Creek, IT/GIS
Jonathan Wise	Allatoona Lake Water Authority, GIS
Mark Kimbrough	PhotoScience, Inc., Geospatial Technician,
Robert Randall	Carolina Mountain Land Conservancy, Water Quality Administrator
Braxton Parsons	Georgia Power, GIS
Josh Proctor	Georgia Power, GIS Data Technician
Jason Bewley	University of Georgia, Geography Masters Program
Austin Marable	GPS/GIS Specialist, Athens-Clarke County
Robert Aultman	Gainesville State College, Adjunct Instructor of GIS,
Charles Bailey	Georgia Forestry Commission

2. GSC student winners of the Georgia Urban and Regional Information Systems Association Thomas Mettille Student Achievement Award

2011

1st place undergraduate award goes to Steve Nash of Gainesville State College for his project entitled, Glade Farm Reservoir

2nd place undergraduate award goes to Joshua Nolan for his project entitled, Probability of landslides in the Coosawattee River Watershed

2010

1st place **graduate** award goes to Zac Miller of Gainesville State College for his project entitled, Lunar Base Site Selection

Note: Mr. Miller possessed a graduate degree prior to entering the GIS Certificate program and thus qualified for the graduate prize.

1st place undergraduate award goes to Karen Burry and Janet Lipscomb for their project entitled Development of Automated Geospatial Model to Determine the Demise of a Small Wetland in Flowery Branch

2nd place undergraduate award goes to Carol Kraemer for her project entitled Analyzing Multipsectral Imagery for Thermal Anomalies to Detect Precursors for Earthquake Activity Using Existing Data

2009

2nd place undergraduate/graduate award of $250 goes to Johnny Reed of Gainesville State College for his project entitled, "A Probability Model for Prehistoric Archaeology Sites in the Chattahoochee-Oconee National Forests"

2008:

2nd place undergraduate award of $250 goes to Charles O'Bailey of Gainesville State College for his project entitled, "Evaluation of Imagery Analysis in Wildfire Damage Severity Assessment and Recovery Prioritization"