wxPerkins Major Effort Component
2011-2012

School of: (Circle one)
- Arts & Sciences
- Professional Studies
- x Technology and Design

Name (s): Prof. Jason A. Montgomery, AIA LEED AP
Prof. Shelley Smith, Chair, Dept. of Architectural Technology
Prof. Anne Leonhardt

Department: Architectural Technology with potential involvement of the CMCE Dept.

Check as many of the following nine required activities as this Major Effort addresses, but not less than one.

Perkins IV Mandated Activities	**Addressed**
1. Strengthen the Academic, Career, and Technical Skills of Students	**X**
2. Link Career and Technical Education at the Secondary Level and Career and Technical Education at the Postsecondary Level	
3. Provide Students with Strong Experience In and Understanding Of All Aspects of an Industry	**X**
4. Develop, Improve, or Expand the Use of Technology in Career and Technical Education	**X**
5. Provide Professional Development Programs to Teachers, Counselors, and Administrators	
6. Develop and Implement Evaluations of Career Education Programs	
7. Initiate, Improve, Expand, and Modernize Quality Career and Technical Education Programs	
8. Provide Services and Activities that are of Sufficient Size, Scope, and Quality to be Effective	
9. Provide Activities to Prepare Special Populations for High Skill, High Wage, or High Demand Occupations that will lead to Self Sufficiency	**X**

a. Describe the need for your Major Effort component.

The combination of the current job climate and economic volatility as well as the major impact new technologies are having on the architectural field results in the need to offer our students an expanding range of skill sets and training in emerging technologies and fields. Geographic Information System hardware and software are the tools that are changing the way information about the natural and built environments is recorded, archived, managed, and made useful for research and analysis. These tools can be particularly useful for documenting and analyzing existing structures. Whether documenting existing conditions for construction projects, or archiving information for the use of historic preservation, GIS based data is emerging as a type of library of the future. There has been an exponential increase in geospatial data made available publicly in recent years, especially in the New York City area. As a growing field that crosses many disciplines, training in GIS data collection, documentation, and analysis offers our students both an enhancement of their architectural skills as well as a new career path alternative. GIS spatial data can be embedded with intelligence that make it a required tool of architects,

landscape architects, urban designers and planners. The ability to successfully integrate large data sets in the design process has become significantly more important for young architects.

This proposal seeks to integrate GIS technology into a learning community that joins our Arch 1100 Architectural Drawing I and Arch 1140 Materials in Architecture courses for both the fall 2011 and spring 2012 semesters. This learning community is a model for our new proposed Building Technology I and II courses being reviewed by the College, and the project will build a structure to support further departmental use of GIS. The primary learning outcomes for these courses are to teach students the techniques for documenting buildings, understanding the materials of structures and their properties, and how these materials are assembled.

c. What are your objectives? Please include which courses are involved with course codes as of Fall 11 and include the projected number of students.

- Develop a protocol for the integration of GIS technology into the future Building Technology Sequence by testing it in the Learning Community Arch 1100 _Arch 1140 (model for future Building Tech I Arch 1130.)
- Enhance students' investigation and documentation of materials and the built environment in the Learning Community Arch 1100_Arch 1140 through detailed collection and analysis of data from the site in addition to research.
- Apply GIS analysis to investigation of sustainability of existing built environments.
- Provide a platform for increasing investigation and use of GeoDesign in the design curriculum.
- Use GIS as a means to train the students in rigorous research methodologies.
- Enhance the students potential for employment through training in GIS data collection, storage, and analysis protocols.

- The primary course involved will be the Learning Community Arch 1100_Arch 1140 to be run in the Fall 2011. (Section numbers to be confirmed.) This course typically has an enrollment of 24-25 students. Ideally, the same project would be run in the same Learning Community in the Spring 2012 semester with a similar number of students. Additional sections of Arch 1100 as well as Arch 1200 with +/- 24 students per section may be set up to also run at least one module of a GIS project.

e. What are the planned activities and how will they achieve the objectives?

1 GIS hardware and software will be utilized to enhance both the drawing and the materials content of the course:
   a. The drawing portion of the course will focus on a series of seminal New York City buildings spanning from the 18th to the 20th century. One major case study will be the

focus of each semester, with minor case studies acting to train the students in the use of the GIS equipment and software. Major case study investigations of structures could include the Dyckman Farmhouse, the Tenement Museum, and the United Nations. Minor case study sites will be indentified the month prior to the start of the semester, including buildings in the Brooklyn neighborhoods close to campus.

b. Each case study site would be documented both in the field using handheld GIS devices that collect the data (including topography, building massing, architectural elevations and details, material types, entry points, occupancy, service areas) and enter it into a geodatabase that can analyzed and used back in the studio. Additional existing documentation such as Historic American Building Survey drawings would also be added to the GIS database. This information would be used to generate three-dimensional models of the sites that would be a fundamental basis for further drawing and analysis of the site.
c. The materials of each structure will be investigated both through on site documentation, research, and potential laboratory testing and analysis in collaboration with the CMCE faculty and students.

f. Will you coordinate with external agencies? If yes, please explain.

This project will be coordinated with a curator from the National Trust for Historic Preservation, based out of Charleston, SC. The protocol for the collection of GIS data will be based on collaboration with the National Trust for Historic Preservation. This coordination would make the information useful for current and future research of the structures documented. The coordination may also lead to potential internship opportunities for our students.

g. Provide a monthly timeline of activities

July 2011:

- Purchase equipment and software
- GIS Training for Faculty
- Develop short list of major and minor case study sites

August 2011:

- Confirm site access and coordinate site visit schedule
- Finalize course schedule
- Set up and test equipment and software

September 2011:

- GIS protocol, data collection training for students
- Minor Case Study #1: Brick Masonry Structure
- Site Visit/Data Collection
- Materials Testing Lab: Brick Type Analysis/Properties
- Student output:

- Analogue model of brick structure
- 3-d Wireframe of structure
- 3-d Wall Section of assembly based on site analysis

October 2011:

- Minor Case Study #2: Wood Structure
- Site Visit/Data Collection
- Materials Testing Lab: Wood Type Analysis/Properties
- Student output:
- 3-d Wireframe of structure
- 3-d Wall Section of assembly based on site analysis
- Sustainability Analysis of Structure (Carbon Footprint, Embedded Energy)

November 2011:

- Major Case Study: Concrete/Steel Structure
- Site Visit/Data Collection
- Materials Testing Lab: Concrete/Steel Analysis/Properties

December 2011:

- Major Case Study: Concrete/Steel Structure continued
- Second Site Visit/Additional Data Collection
- Student output:
- 3-d Wireframe of structure
- 3-d Wall Section of assembly based on site analysis
- Sustainability Analysis of Structure (Carbon Footprint, Embedded Energy)
- HABS Standard Document Set of Structure (hand drawn)

January 2012:

- Assessment
- Adjust course outline based on results of assessment
- Confirm case study sites

Spring Semester 2012:

- Repeat tasks above with adjustments

Evaluation

List the quantitative evaluation methods used to meet your objectives and their outcomes. Limit to 1 or 2 outcomes.

Evaluation Measure	Anticipated Outcome
Improve student understanding of GIS and its application to documentation and analysis of sites based on beginning of semester exam compared with end of semester exam	Students' knowledge will demonstrate at least 30% improvement on the post test

Train the students in the use of a GIS Protocol for research, data collection, storage, and analysis. A rubric will be developed to evaluate the level of consistency in applying the protocol to each case study.	Students' accuracy following the protocol will improve from Minor Case Study #1 to the Major Case Study by 20%.

As per 2010-2011 Guidelines:
Examples include: retention rates, completion/graduation rates, quantitative evaluation instruments that measure the career skills gained by students during the course of the major effort, pre- and post-test results, and assessments of staff development activities. For each method, list the corresponding outcome or achievement to be reached during the funding year. All outcomes must be identified as quantifiable student outcomes related to skills attainment, retention, completion, and/or placement. If one of the objectives of the major effort is full participation in training to prepare individuals for nontraditional employment, quantitative evaluation measures must be designed to measure this objective. RESULTS OF SURVEY INSTRUMENTS DESIGNED TO MEASURE STUDENT/FACULTY SATISFACTION WILL NOT BE ACCEPTED AS EVALUATION MEASURES**.**

Complete itemized budget also required
For each staff/faculty member provide

Name	**Title**	**Time**	**Salary**
1. Research Technician			$4,000
2. Jason Montgomery	Assistant Professor	GIS training (2 courses)	$2,000

For supplies and equipment please provide:
(Equipment is a single item with unit cost of $5000 or more)

Description of Item	Quantity	Unit Cost	Proposed Expenditure
Esri Mobile GIS Data Collection Devices with built in GPS (GeoCollectors)	4	$8700.00	$34,800.00
Canon EOS SLR Camera	4	$1000.00	$4000.00
Canon Telephoto Zoom Lens	2	$710.00	$1420.00
Canon Fisheye Lens	2	$720.00	$1440.00

Map Pluto (NYC Shape Date Files that feed into GIS)	2 (Brooklyn + Manhattan)	$300.00	$600.00