The **BUSINESS RESEARCH AND EDUCATION CENTER (BREC)** is a focal point and resource for faculty research projects, various student programs, and the facilitation of interactive efforts and programs between the School of Business and Public Administration and a myriad of community, business and government interests throughout the regional Kern County area. Among other ongoing programs, BREC is offering a Geographic Information Systems (GIS) Professional Development Program.

BREC is devoted to providing GIS training, services, infrastructure and spatial analysis to campus entities along with the community. BREC is committed to building a geo-spatial infrastructure to increase the GIS capacity throughout and beyond regional Kern County.

GIS allows us to view, query, interpret, visualize, and analyze data in ways that expose relationships, patterns, and trends in the form of maps, globes, charts/graphs, reports, and visualizations. By analyzing data in a way that is instantly understood and easily shared, GIS helps us answer questions and solve problems.

There is a demand for GIS professionals in local and national job markets. This demand is expected to grow substantially in the near future. GIS professionals work in a variety of fields, including local, state, and federal public sectors, the private sector (i.e., logistics and market analysis), as well as in GIS software firms. In our local job market, GIS is commonly used in agriculture, oil and gas production and exploration, engineering, business analysis and development, utilities, government sectors, and more. Employers are seeking individuals with the skills and knowledge required to solve the increasingly complex challenges that face businesses and government agencies. In recognition of this growing trend in GIS, BREC’s GIS Program offers students application-oriented training in the use of this maturing technology. The courses are designed to provide students with skills and a conceptual base from which they will be able to develop and manage small to large-scale GIS projects.
The first three courses of the program will introduce students to GIS applications, which will help them select a track of study for the second two courses. The program offers three tracks of study:

- **Transportation and Logistics**
  ArcLogistics has helped professionals in dozens of industries quickly create optimum schedules and routes. Factors such as time, cost, capacity, and productivity must be considered when selecting locations to assign sequential vehicle stops. GIS is used to help save time and money. This track will also touch on other business-oriented applications such as banking, insurance, media, real estate, and retail business.

- **Agriculture**
  Balancing the inputs and outputs on a farm is fundamental to its success and profitability. The ability of GIS to analyze and visualize agricultural environments and workflows has proven to be very beneficial to those involved in the farming industry. GIS is also used to manage natural resources in forestry, mining, and oil and gas.

- **Environment**
  Scientists and environmental managers use GIS to study the environment, report on environmental phenomena, and model how the environment is responding to natural and man-made factors. Applications related to environmental management and conservation involve water, oceans, land, wildlife, vegetation, and the balance between elements.

Upon completion of the program, students may also apply their GIS skills in other professional fields such as: government, education and science, and utilities. In government sectors, GIS is used in homeland security, military defense, fire, emergency response, law enforcement, and health.

**Benefits of Program**

- Individuals seeking advancement in their current field, or those interested in professional development or continued education.
- Those looking for a career change or vocational addition.
- Beginning students in search of a program that: supports a growing field, is short in duration, is rewarding, interesting and fun.
• Professionals seeking GIS professional certification through the GIS Certification Institute or the Urban and Regional Information Systems Association (URISA).

The program is designed for students, the general public, and professionals in local government, urban and regional planning, agriculture, oil and gas, facilities management, business, and other fields who need to become skillful users of GIS. There are no prerequisites to enter the program, as no prior experience with geographic information technologies is required.

**Program Course Schedule**

The program offers twenty-five units of university credit. The program includes three GIS-based courses that anyone can take, and then two courses based on one of the following tracks: Transportation and Logistics, Agriculture, and Environmental.

**Summer 2010**

**BA 405: Introduction to Geographic Information Systems (5 units).** Students are introduced to fundamentals of geographic information systems (GIS). Students will learn the basic skills, terms, and principles of geographic information systems. Such knowledge should be considered as the minimum requirements for any MIS student entering the information systems field today. Students are encouraged to explore topics of interest and/or those topics that might be pertinent to future career. The pedagogy consists of lectures, projects, written reports, and topic analysis.

**Fall 2010**

**ArcGIS: Geodatabase Management and Design (5 units).** The geodatabase is the data storage and management framework for ArcGIS. This course teaches the essential concepts of the geodatabase and introduces its range of functionality. Students will learn how to create a geodatabase, migrate existing GIS data to a geodatabase, and edit data stored in a geodatabase. Geodatabase topology is used to maintain the spatial integrity of data. This course teaches how to use geodatabase topology to more accurately model the real world. A well-planned and efficient design is critical to the success of a geodatabase implementation. This course explains the steps involved in the geodatabase design process, from preliminary planning to schema creation.
You learn how to take advantage of existing ArcGIS data models and become familiar with data modeling techniques.

**Winter 2011**  
**Raster GIS and Remote Sensing (5 units).**

This course entails two components: remote sensing in GIS and raster GIS and analysis. The first part introduces students to Remote Sensing principles, processes, and techniques. Topics include: satellites and sensor properties, the electromagnetic spectrum, spectral signatures and multispectral image analysis, image classification, applications, integration with GIS, and image processing software. Students will develop and exercise skills in aerial image interpretation. The more images you interpret, the better interpreter you become. The second part of the course involves ArcGIS and raster analysis. Topics include the use of raster GIS tools for modeling and environmental analysis; raster data structure; simple raster surface modeling and image integration; proximity and dispersion modeling; and cost surfaces. Students will learn to analyze and process raster data using Spatial Analyst and 3D Analyst extensions. Participants will have the opportunity to use map production tools to prepare raw data and produce a variety of thematic maps.

**Spring 2011**  
**GIS: Transportation and Logistics (5 units).**

In any delivery setting, efficiency in time, money, and resources is fundamental to system operations. ArcLogistics 9.3 is a route-optimization program designed to route multiple vehicles simultaneously while honoring complex business rules, such as vehicle capacity, time windows, and working hours. This course provides an overview of ArcLogistics capabilities and the various parameters and components required to create routes. Students will also use Business Analyst and Network Analyst extensions to solve problems and support decision-making processes.

**Summer 2011**  
**GIS Project / Internship (5 units).**  
This is the last course of the program cycle, students apply newly developed skills to a GIS project. The course will be independent study with instructor supervision. Students will submit project proposals based on a needs
assessment and then carry out the project. Students may choose an internship and document experiences in a written report to satisfy this course. Projects should relate to chosen track of study.

Awarding of Completion.

**BA 405: Introduction to Geographic Information Systems (5 units).**
This quarter marks the beginning of a new cycle.

**Additional Educational Opportunities**

Each quarter, an ESRI Instructor-Led course will be offered on-campus to students looking to expand their knowledge of GIS. Each ESRI Instructor-Led course awards a certificate of completion, which is a great opportunity to add to any resume.

**Program Completion Requirements**

A chosen track of study:
- Transportation and Logistics
- Agriculture
- Environment

Completion of 25 program course units:
- BA 405: Introduction to Geographic Information Systems (5 units).
- ArcGIS: Geodatabase Management and Design (5 units).
- Raster GIS and Remote Sensing (5 units).
- Chosen track option (5 units):
  - Transportation and Logistics
  - Agriculture
  - Environment
- Completion of Project/Internship (5 units).

**Course Formats**
Traditional lecture instruction with hands-on lab exercises.
Web-based instruction, tutorials, and research.
Hybrid/Online.