

## COURSE OUTLINE Introduction to Geospatial Information Systems (GIS)

### **Course Description**

PS 115. Introduction to Geospatial Information Systems (GIS). 3 hours credit. This course will enable the student to understand spatial referencing concepts through Geographic Information Systems (GIS). The student will work with basic spatial data manipulation skill-sets necessary for utilizing GIS in the workplace. The student will study fields such as, environmental sciences, biological sciences, geology, physical sciences, behavioral sciences, geography, history and economics. The student will divide class time between lecture, computer and instructor-led tutorials, computer lab, and fieldwork.

### **Course Relevance**

The skills learned in this course will introduce the student to the fundamentals of GIS. This will provide the student with an enhanced understanding of how GIS relates to environmental sciences, biological sciences, geology, physical sciences, behavioral sciences, geography, history and economics.

### **Required Materials**

Gorr. *GIS tutorial 1: Basic workbook (w/CD and DVD)*. ESRI, Inc.

Allen. *GIS tutorial 2: Spatial analysis workbook*. ESRI, Inc.

\* - For complete textbook information, refer to <http://www.butlercc.bkstr.com>

### **Learning Outcomes**

The intention is for the student to be able to:

1. Apply spatial analysis to problems in earth science, life science, environmental science, behavioral science, social science or the field of specialization by managing layers, activating layers and their properties.
2. Interpret non-spatial data using query, buffer, and other analytical tools universal to GIS.
3. Understand basic GIS terminology.
4. Demonstrate proficiency in using ArcGIS software to produce a product of local, regional, national, or worldly interest, by qualitative data (maps) assessments to quantitative data (statistical) assessment.

### **Learning PACT Skills that will be developed and documented in this course**

Through involvement in this course, the student will develop ability in the following PACT skill area(s):

#### **Technology Skills**

1. Discipline-specific technology

Through the creation of a GIS product, the student will demonstrate proficiency in  
PS 115 Introduction to Geospatial Information Systems (GIS)

the activation and management of GIS software, hardware and data.

### **Personal Development Skills**

#### 1. Personal interaction

Through interaction on a group project, the student will demonstrate teamwork to complete a GIS project.

### **Analytical Thinking Skills**

#### 1. Problem solving

Through the completion of the GIS project, the student will demonstrate how the project helps resolve or solve an issue relative to the world in which we live.

### **Major Summative Assessment Task(s)**

These learning outcome(s) and the Learning PACT skill(s) will be demonstrated by:

1. Producing a GIS product (T skill) of local or regional value as a group project (P skill) solving or resolving a local, regional, national or worldly issue (A skill).

### **Course Content**

- I. Skill or Competencies – Actions that are essential to achieve the course outcomes:
  - A. Understand the fundamental concepts of spatial relationships, geo-referencing, and GIS
  - B. Understand the concepts of GIS
  - C. Demonstrate knowledge of various GIS methodologies and accuracies

### **Learning Units**

- I. Understand fundamental concepts of spatial relationships of geo-referencing, GPS and GIS
  - A. People
  - B. Software
  - C. Hardware
  - D. Data
    1. Collecting data
    2. Descriptive statistics
  - E. Spatial Analysis
    1. Dispersion
      - a. Normal distribution
      - b. Standard deviation
    2. Trends - correlation and regression
- II. Research and acquire useable map projections and coordinate systems
  - A. Federal Government
  - B. State
  - C. County
  - D. Private sector
- III. Recognize the importance of geo-referencing to GIS and stacking layers of information for analysis
  - A. Acquire data files
  - B. Edit metadata files for data needed
  - C. Convert metadata files into usable shapefiles

D. Synthesize shapefiles and data files to create a basic Arcmap

IV. Make quality maps

- A. Map composition
- B. Symbolize and classifying features for optimum map display and analysis
- C. Scale, Geo-datum and projection
- D. Digitize and editing new map features and their attributes
- E. Produce quality presentation maps

V. Apply Geo-code addresses, GIS concepts, and collection of data files

- A. Explore geographical data
- B. Analyze geographical information
- C. Act of geographic knowledge
- D. Ask geographic questions
- E. Acquire geographical resources

VI. Apply geospatial knowledge, data, skills and perspectives to:

- A. Problem/situational analysis
- B. Arrive at informed decisions and solutions

### **Learning Activities**

Learning activities will be assigned to assist the student to achieve the intended learning outcomes through lecture, instructor-led class discussions, tutorials, fieldwork, guest speakers, group activities, drills/skill practice, and others at the discretion of the instructor.

### **Grade Determination**

The student will be graded on learning activities and assessment tasks. Grade determinants may include: daily work, quizzes, chapter or unit tests, comprehensive examinations, student projects, student presentations, class participation, and other methods of evaluation at the discretion of the instructor.