I. GENERAL DESCRIPTION
A. Approval Date  February 2011
B. Department  Engineering and Tech & Earth Sci
C. Course Number  GIS 110, GEOG 110
D. Course Title  Introduction to GIS
E. Course Outline Preparer(s)  Gordon Ye
F. Department Chair  Fabio Saniee, Katryn Wiese
G. Dean  David Yee

II. COURSE SPECIFICS
A. Hours  Lecture: 2.5 weekly (43.75 total)
          Laboratory: 1.5 weekly (26.25 total)
B. Units  3.0
C. Prerequisites  CNIT 100 or demonstration of CNIT exit skills
Corequisites  None
Advisories  None
D. Course Justification  Introductory course to Geographic Information Systems (GIS) technology and its applications in various fields. Provides students with varying backgrounds and work experiences the opportunity to learn the basic concepts and practical applications of GIS as they apply to various fields.
E. Field Trips  No
F. Method of Grading  Letter
G. Repeatability  0

III. CATALOG DESCRIPTION
A primer course for GIS technology. History, structure, uses, and current trends of GIS, related fundamental concepts, basic query and cartography operations using an industry-standard GIS software such as ESRI’s ArcGIS™.

IV. MAJOR LEARNING OUTCOMES
Upon completion of this course a student will be able to:
A. Describe the types of applications which lend themselves to a GIS.
B. Identify commonly used GIS data formats.
C. Formulate basic spatial query and analysis using GIS.
D. Design maps using GIS to communicate effectively.
E. Obtain, evaluate, and utilize GIS data from the internet.
F. Perform basic GIS tasks such as digitizing, geocoding, and georeferencing.
G. Construct a simple decision-support model in GIS.

V. CONTENTS
A. Overview of what GIS is
   1. earth-based information
   2. graphic (spatial) data
   3. database
B. Structure of GIS
   1. Graphical data models
      a. Vector data model
      b. Raster data model
   2. GIS file formats
      a. Shapefiles
      b. Personal geodatabase/file geodatabase
      c. Raster/image/GRID formats
   3. Organized into layers by theme
   4. Topology
   5. Earth-based coordinate systems
      a. Latitude and longitude
      b. Map projections
C. Graphical output basics
   1. Kinds of data
      a. Nominal, ordinal, interval/ratio
   2. Kinds of maps
      a. Reference
      b. Thematic
      c. Qualitative
      d. Quantitative
   3. Map scale
   4. Data scale and resolution
      a. Precision
      b. Accuracy
   5. Visual hierarchy
      a. Color
      b. Symbol
      c. Text
   6. Principles of good cartographic design
D. Basic GIS Query and Analysis
   1. Select by attributes: Using SQL expressions
   2. Select by location
   3. Overlay analysis: dissolve, buffer, union, intersect
   4. Raster analysis basics
E. Basic GIS data creation
   1. Georeferencing
   2. Digitizing
   3. Plotting x,y data
   4. Tabular join
5. Geocoding addresses

F. Obtaining and evaluating GIS data
   1. Metadata
   2. Imagery – aerial and satellite
   3. Public GIS data sources online

G. Quantitative methods in cartography and GIS
   1. Representing unique values, numerical ranking, quantities
   2. The choropleth map
   3. Using the database to filter, symbolize, and label
   4. Site suitability modeling

H. Major GIS application fields
   1. Natural resources management
   2. Land-use planning
   3. Infrastructure operations and planning
   4. Marketing
   5. Natural sciences
   6. Social and economic research

VI. INSTRUCTIONAL METHODOLOGY
A. Assignments
   1. Out-of-class reading assignments from the textbook as well as selected journal articles.
   2. In-class lab assignments that produce reports and maps describing results of GIS analysis.
   3. In-class lab assignments that involve independent design and problem-solving.

B. Evaluation
   1. Lab assignments – evaluated on whether the student completed the lab task correctly
   2. Short quizzes – on topics such as uses of cartographic elements; how to construct simple SQL queries; how to understand maps and grasp quantitative information from them, etc.
   3. Final exam – covers all topics taught in the course

C. Textbooks and other instructional materials
   2. Articles from journals and industry newsletters.

VII. TITLE 5 CLASSIFICATION
CREDIT/DEGREE APPLICABLE (meets all standards of Title 5. Section 55002(a)).