I. Course ID (department and course number) GIS 105

II. Course Name: Cartography and Visualization of Geospatial Data

III. Number of Credits Awarded for Course: 3 credits (4 contact hours, 2 lecture and 2 lab)

IV. Prerequisite or Co-requisite Courses or Academic Standing (if applicable):

Pre-requisites = College Algebra (MAT 100) or Mathematical Analysis I (MAT 106)

V. Indicate if New or Modified Course (if modified course, list old course ID)

New course

VI. Semester and Year Course Will First Be Offered (or, if a modified course, semester and year when revised course will be offered):

Fall 2011

VII. Name and Telephone Number and/or e-mail Address of Department Chair or Other Appropriate Contact Person

Catherine Sirangelo-Elbadawy, Division Dean

VII. Detailed Course Description

This course provides a comprehensive study of cartography related to Geographic Information Systems (GIS) including visualization of geospatial data, cartographic principles, data acquisition techniques, and methods of base map development. The course includes map projections, map scales, types of thematic maps, field mapping techniques including GPS, and map accuracy. Scanning, digitizing and coordinate geometry techniques used in GIS base map development are introduced through hands-on exercises and computer-assisted mapping projects using ArcMap and ArcCatalog.

IX. Outline of Course Objectives

Upon successful completion of this course, students will be able to:

1. Utilize ArcGIS, ArcMap, and ArcCatalog
2. Navigate ArcMap and identify vector features and raster cell values in a map display
3. Select and utilize features and spatial bookmarks in a map display
4. Launch ArcMap and use ArcMap Navigational Tools (Zoom, Pan, Full Extent, etc.)
5. Identify the parts of the ArcMap window and features in a map display
6. Set selectable layers in a map display and use bookmarks to navigate in a map display

7. Launch ArcCatalog, identify the parts of the ArcCatalog window and view data contents in ArcCatalog
8. Join a non-spatial data table to a spatial data table
9. Select features using an attribute-based query and a location-based query
10. Geocode a single address
11. Create a new shapefile and add data to a new shapefile (heads-up digitize)
12. Create a buffer around features in a map display
13. Understand the concept of spatial reference
14. Georeference an image layer to a feature layer
15. Create an Address Locator

X. Texts, Journals, and Other Materials Used In Course

1. Background readings and other materials for faculty teaching the course.

   Carver, Steve, Sarah Cornelius and Ian Howard. An Introduction to Geographical Information Systems, 3rd Edition. Upper Saddle River: Prentice Hall, 2006.
2. Proposed student texts.

   Terry A. Slocum**,** Robert B McMaster**,** Fritz C Kessler**,** Hugh H Howard**,** Thematic Cartography and Geovisualization, 3/E. Prentice Hall, 2009
3. Supplementary readings for students.

   Kraak, M-J., Ormeling, F. Cartography – Visualization of geospatial data. Prentice Hall, 2003
   Borden Dent, Jeff Torguson, and Thomas Hodler. Cartography: Thematic Map Design; 6th Edition; McGraw-Hill 2008)

   Gretchen N. Peterson. GIS Cartography: A Guide to Effective Map Design. CRC Press 2009

   Chrisman, Nicholas. Exploring Geographical Information Systems, 2nd Edition. New York: John Wiley & Sons, 2003.
   Connolly, James and Mark Lake. Geographical Information Systems in Archeology. London: Cambridge University Press, 2006.
   Delaney, Julie and Kimberly Van Niel. Geographical Information Systems: An Introduction. Oxford: Oxford University Press, 2007.
   DeMers, Michael. Fundamentals of Geographical Information Systems. New York: John Wiley, 2008.
4. Databases: Academic Search, Lexis Nexis, Science Direct

   Students will use Microsoft Office Suite, an Internet Browser, and ArcView 9.3 GIS software (which include Satellite Tool Kit and GPS units).

XI. Grade Determinants

1. Two Practical Exams 40%
2. Final Exam 20%
3. Group Project 20%
4. Lab Activities and Lab Report 20%

Total 100%

XII. Number of Papers and Examinations

Lab reports, a group project, 3 exams.

Students will be assigned questions, on various topics, to be researched for the course. In addition, students will be required to write lab reports on topics discussed in class

XIII Schedule of Topics to Be Covered

Week	Topic	Lab Assignments
1st	Introduction To ArcGis ArcMap	ArcGis And ArcMap Orientation
2nd	Navigating ArcMap; Exploring Elements Of The ArcGis Application; Interactively Selecting Features In A Map Display	Open An Existing Map Document, Identifying The Parts Of The ArcMap Window, Understanding Map Scale In ArcMap And Setting Selectable Layers In A Map Display
3rd	ArcGis Catalog; Building A Geospatial Technology Vocabulary With Terminology Related To Tools And Functions Of The ArcCatalog Software	Launching ArcCatalog, Viewing Contents In ArcCatalog
4th	**Exam 1**	**Lab Test #1**
5th	Navigating ArcCatalog; Exploring And Viewing Different Data Formats And Metadata For Different Data Types, Searching Data Using Geographic Search Criteria	Data Layers And Formats; Medata Styles; Editing Metadata, Searching For Data In ArcCatalog, And Adding Data Directly From ArcCatalog
6th	Displaying Geospatial Data; Exploring Terminology Associated With Geospatial Data, Geospatial Analysis	Scale Thresholds; Entities And Attributes; Sorting Records In Attribute Table
7th	Editing Data Frame Properties And Creating A Map Layout	Creating, Exporting And Printing A Map Layout
8th	**Exam II**	**Lab Test #2**
9th	Managing Geospatial Data; Joining A Non-Spatial Data Table To A Spatial Data Table; Using An Attribute-Based And Location-Based Query	Managing Geospatial Data; Map Display Based On Location And Attributes; Adding A Table To A Layout Page

10th	Creating Geospatial Data; Geocoding A Single Address; Creating A New Shape File And Editing A Map Layout	Creating Geospatial Data, An Address Locator And New Shapefile In ArcCatalog; Exploring The Concept Of Spatial Reference
11th	Analyzing Geospatial Data; Exploring The Benefits Of A Community Data Inventory, Editing Data Layers	Analyzing Geospatial Data
12th	Preparing Data; Exploring The Concept Of Spatial Reference; Georeferencing An Image Layer To A Feature Layer; Adding Data To A New Shapefile; Changing The Transparency Of A Data Layer In The Map Display	Preparing Data: Georeferencing An Image Layer; Changing The Coordinate System Of A Data Frame; Editing A Layer To Add Data To A New Polygon Shapefile
13th	Planning And Building A Local Data Inventory; Using Different Geospatial Data Navigation Techniques; Editing Feature Property Including Symbology; Editing Data Frame Properties And Creating A New Shapefile Data Layer	Preparing Tabular Data In A Spreadsheet Program For Use In ArcGis; Adding Local Data To New Map Document; Downloading And Extracting Data Files From The Internet, Displaying XY Tabular Data In A Map Display
14th	Submission of Project Reports and Presentations	
15th	**Final Exam**	