

METROPOLITAN STATE COLLEGE OF DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of Letters, Arts & Sciences

Department: Earth and Atmospheric Science

Semester(s) Offered: Fall

Prefix & Course Number: GIS4860

Crosslisted With*: N/A

Course Title: GIS Applications

Credit Hours: 4 (3+2)

Contact Hours: Lecture 45 Lab 30 Internship _____ Practicum _____

Schedule Type(s): B **Grading Mode(s):** L

Repeat* (Variable topics): N/A

*(Pertinent only if the course can be repeated; enter maximum number of hours that can be earned by taking this course.)

Restrictions (Variable Topics Course): N/A

Prerequisite(s),

GIS 2250

C or better in prerequisite courses

Upper division standing

Or permission of instructor

Corequisite(s):):

Prerequisite(s) or Corequisite(s):

GIS 3250

Catalog Course Description:

This course provides advanced theoretical and practical knowledge in Geographic Information Systems (GIS), with emphasis on vector data models. Students will gain conceptual knowledge about the advantages and limitations of various vector GIS data models (shapefiles, coverages, geodatabases) in support of land management and scientific applications, as well as practical exercises using Arc/Info and ArcGIS software. Students will gain advanced experience in spatial data management, spatial analysis, and project management through a GIS application project of their own creation.

Prefix and Course Number: GIS4860__

Required Reading and Other Materials will be equivalent to (Title, Author, Publisher, Copyright Date):

GIS Tutorial: Workbook for ArcView9, William Gorr and Kristen Kurland, Environmental Systems Research Institute, Redlands, CA., 2005

Modeling our World: The ESRI Guide to Geodatabase Design, Environmental Systems Research Institute. Redlands, CA. 1999

Readings from different books, manuals, scientific a trade journals

Specific (Measurable) Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. Describe the characteristics of vector data models and vector file formats
2. Recognize common vector file formats within computer file systems
3. Digitize new vector datasets from paper and digital maps.
4. Import, export, and convert vector datasets between vector file formats such as shapefiles, coverages, and geodatabases
5. Set map projections for display and map production purposes
6. Create feature datasets with a common map projection
7. Transform and correct map projection parameters
8. Analyze and model spatial relationship using vector operations
9. Set metadata requirements
10. Create metadata
11. Determine data and analysis requirements for GIS projects
12. Manage a GIS project from inception to completion including data collection, data processing, data analysis, map production, and documentation.
13. Determine and use GIS software (ArcGIS and Workstation Arc/Info or the current equivalent) to manage data and solve simple to complex spatial problems

Detailed Outline Of Course Content (Major Topics and Subtopics) or Outline Of Field Experience/Internship (experience, responsibilities and supervision):

1. Vector data model categories
 - 1.1 Geo-relational
 - 1.2 Object-relational
2. The characteristics of vector file formats
 - 2.1. Shapefiles
 - 2.2. Coverages
 - 2.3. Geodatabases
 - 2.4. File management
3. The process of vector dataset creation
 - 3.1. Digitizing

- 3.2. Raster conversion
- 3.3. GPS importing
- 3.4. Constructing topology
- 3.5. Error correction
- 3.6. Database creation
- 3.7. Database editing
4. Map projections
 - 4.1. Transformation of non-geographic datasets
 - 4.2. Defining and reading projection files
 - 4.3. Re-projecting datasets
5. Analysis and modeling using vector datasets
 - 5.1. Topological analysis functions
 - 5.2. Non-topological analysis functions
 - 5.3. The application of analysis functions for spatial problem solving
6. Metadata requirements
 - 6.1. Metadata standards
 - 6.2. Metadata creation and editing
 - 6.3. Cartographic metadata
7. Project management
 - 7.1. Determining goals and objectives
 - 7.2. Determining data and technical requirements
 - 7.3. Determining analysis requirements
 - 7.4. Determining milestone requirements
 - 7.5. Project implementation
 - 7.6. Project evaluation
 - 7.7. Project documentation
8. Software systems
 - 8.1. ArcView
 - 8.2. Arc/Info
 - 8.3. ArcGIS

Evaluation of Student Performance:

Examinations and quizzes

Assignments and lab exercises

Original project

Class participation