Syllabus GEOSCI 494A CPE 9/3/08

Fall 2008 UMass Outreach Continuing and Professional Education

Department of Geosciences

GEO-SCI 494A: Introduction to Geographic Information Systems (GIS): Interdisciplinary Applications.

Lecture and Lab: 3-Credits W 6:00 - 9:00 Morrill IV 271

Instructor: Sean M. Fitzgerald, sf@geo.umass.edu, 572-2906 (H)

Office hours: W 3:30-5:30pm or by appointment

Objectives:

The objective of this course is to introduce the concepts and principles of GIS. Both theoretical and applied themes of GIS are included in this course; with an emphasis on professional application. Through the completion of labs and a final project, the students will become proficient in using ESRI ArcGIS for mapping, basic spatial analysis and other GIS applications.

Prerequisites:
Basic knowledge of computers, including MS windows

Required textbook:

(Available in Textbook Annex or online.)

- GIS Fundamentals: A First Text on Geographic Information Systems, 3rd edition, Paul Bolstad, Paperback: 620 pages Publisher: Eider Press; 3rd edition (2008)
  ISBN-10: 0971764727
  ISBN-13: 978-0971764729

Reference books: *(optional)*

- The ESRI Guide to GIS Analysis, Volume 1: Geographic Patterns and Relationships, Andy Mitchell, ESRI Press, 1999.
- The ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics. Andy Mitchell, ESRI Press, 2005.

Session Overview:

Sessions include a lecture phase covering GIS concepts and theory, and a Lab phase doing topical or thematic exercises, and/or assignments.

Completed exercises and assignments may be submitted by email attachment in MS Word or PDF format. Use 'GIS Lab #' as your email subject.

Session 1: Introduction to ArcGIS I

Lab-server protocol and Data Archives

Establish course modules

Project Topics

Session 2: Introduction to ArcGIS II

Data models-Vector and raster

Geodatabases-Arc Catalog

ARC MAP

ARC CATALOG Projections, Coordinate Systems Datums

Thematic Module: Earth Systems

Session 3: Descriptive Analysis Thematic Mapping I

Attribute Data Tables-Queries

GPS & Remote Sensing Data Sources

Session 4: Descriptive Analysis Thematic Mapping II

Table Statistics

Vector data analysis, and Boolean and Continuous surfaces

Thematic Module: Socio-Political demographic analysis

Session 5: Basic spatial analysis -selection and classification

Buffer and Overlay operations

Session 6: Map overlay-SMCDA-Model Builder

Focal, Zonal and Block operations

Thematic Module: Economic Analysis

Session 7: Spatial Join-Geo-coding

Introduction to Descriptive Spatial Statistics

Thematic Module: Epidemiology and Health Analysis

Session 8: Spatial Pattern Analysis

Interpolation and (Inferential) Geo-statistical analysis

Thematic Module: Public Policy Analysis

Session 9: Introduction to Path & Network Analysis-Logistics

Multi-Objective Spatial Analysis

Session 10: 3D analysis-TIN DEM data models

View-shed Terrain Analysis –Site suitability

Spatial Modeling Review

Session 11: Projects I

Session 12: Projects II

Session 13: Projects III

Session 14: Presentations