PRINCIPLES OF GEOGRAPHIC INFORMATION SCIENCE (GISc)
GEP 205 (Undergraduate level)
GEP 505 (Graduate level)

3 Credits, 4 hours
Class Meets on Thursdays from 6:00 - 9:20 PM
Gillet Hall, Room 311

Instructor: Dr. Juliana Maantay - Gillet Hall, Room 303
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Office Hours: M, TH, 4:30-5:30 PM, and by appointment

COURSE DESCRIPTION:

This course covers basic concepts and theories of Geographic Information Science (GISc), as well as provides actual hands-on experience with a Geographic Information Systems (GIS) software package for computer mapping and data analysis.

Through a series of lectures, GIS laboratory exercises, and the design of a GIS project, students are taught the variety of ways GIS can be used in the natural and social sciences, as well as many other fields. GIS is beneficial to any field using information which is linked to geography, such as environmental management (including soil science, geology, ecology, hydrology), economic development, real estate, urban planning, public health administration, epidemiology, archaeology, marketing, political science, navigation, and tourism, as well as the traditional geographic fields of cartography, demography, climatology, and natural resources.

Laboratory exercises will include simple database creation, generation of statistics, data analysis, and the production of thematic maps and charts. Demographic, socio-economic, environmental, land use, and health data sets will be utilized in the lab exercises.

REQUIRED TEXTBOOKS:


COURSE REQUIREMENTS:
GIS Laboratory Exercises and Assignments (8) 50%
Written Assignments (2) 15%
Class Participation and Attendance 10%
Final Exam (Take-Home) 25%

WEEK 1 February 1, 2001
Introduction to the Principles of GIS

Lab Exercise: ArcView GIS Demonstration

Readings: Heywood, Chapter 1

WEEK 2 February 8, 2001
Spatial Data and GIS Functionality

Lab Exercise: ArcView Tutorial

Readings: Heywood, Chapter 2

WEEK 3 February 15, 2001
Thematic Mapping

Lab Assignment #1: Thematic Mapping - Creating a Dot Density Map

Readings: Dent, Chapters 1 and 4

WEEK 4 February 22, 2001
Data Classification

Lab Assignment #2: Thematic Mapping - Creating a Choropleth Map

Readings: Dent, Chapters 5 and 7

Written Assignment #1: Report on GIS Projects on the Internet (Due Week 6)

WEEK 5 March 1, 2001
Charts and Graphs

Lab Assignment #3: Working with Charts

Readings: Dent, Chapter 18

WEEK 6 March 8, 2001
Map Design and Composition
Lab Assignment #4: Composing a Map Layout

Readings: Dent, Chapter 13

**WEEK 7** March 15, 2001
Spatial Data Structures and Modeling

Lab Work: Complete Lab Assignments #1-4 (ALL LABS #1-4 DUE)

Readings: Heywood, Chapter 3

**WEEK 8** March 22, 2001
Attribute Data Management

Lab Assignment #5: Developing an Attribute Database From an Internet Source

Readings: Heywood, Chapter 4

Written Assignment #2: Designing a GIS Project to Solve Real-World Problems in the News. Example: "Using GIS to Build a Case for Sumo Tribal Stewardship of their Land in Nicaragua" (Due Week 14)

**WEEK 9** March 29, 2001
Data Acquisition (Where do Data Come From?)

Lab Assignment #6: Geo-Coding

Readings: Heywood, Chapter 5

SPRING BREAK - NO CLASSES

**WEEK 10** April 19, 2001
Spatial Analysis; and Discussion of GIS Case Studies from Clarke

Lab Assignment #7: Generating Buffers and Using Theme-on-Theme Selection for Proximity Analysis

Readings: Heywood, Chapter 6; and GIS case studies from Clarke (on reserve at Lehman Library)

**WEEK 11** April 26, 2001
Analytical Modeling in GIS

Lab Assignment #8: Geo-Processing and Table Joining

Readings: Heywood, Chapter 7
WEEK 12 May 3, 2001
Output and Decision-Making in GIS

Lab Assignment #8: (Continued) Preparing Final Presentation Layouts

Readings: Heywood, Chapter 8

WEEK 13 May 10, 2001
GIS Project Design and Management; Ethical Issues in GIS; Course Review

Lab Assignment #8: (Continued) Preparing Final Presentation Layouts


Take-Home Final Exam Distributed - Due Monday, May 21, 2001

WEEK 14 May 17, 2001
Students' Presentation of Projects - Written Assignment #2

Lab Work: Complete all Lab Assignments #5-8 (ALL LABS #5-8 DUE)

WEEK 15
(Finals Week)

FINAL EXAM (Take-home) due on Monday, May 21, 2001, 6 PM

FURTHER RECOMMENDED READINGS:

BERNHARDSEN, Tor, Geographic Information Systems, 1992, Viak IT, Arendal, Norway
BERRY, Joseph, Spatial Reasoning for Effective GIS, 1995, John Wiley and Sons, NY, NY

**PERIODICALS AND JOURNALS:**