

WILLIAM RAINEY HARPER COLLEGE
BUSINESS AND SOCIAL SCIENCE DIVISION
GENERAL COURSE OUTLINE

GEG Course Prefix	151 Course Number	Geographic Information Systems I Course Title	(2 - 2) Lec-Lab	3 Semester Hours
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COURSE DESCRIPTION

Introduces the concepts and problem solving capabilities of Geographic Information Systems (GIS). Spatial data sourcing and management will be learned using information acquired in the field or from other sources. Spatial analysis concepts will be introduced through hands-on exercises with GIS software.

Prerequisite: GEG 150 with a grade of "C" or better.

TOPICAL OUTLINE

I. Data Formats and Sources

- A. Legacy and current GIS data formats
- B. Image formats
- C. Public sources of GIS data
- D. Data import/export and conversion
- E. Deriving new data (Contours etc.)
- F. Connecting to external data sources with GIS software
- G. Data organization and naming conventions

II. Spatial Databases

- A. Spatial database structures, with emphasis on ESRI Geodatabase
- B. Retrieving data using SQL (Structured Query Language) queries
- C. Fundamentals of spatial database design
- D. Modeling entities with subtypes, domains etc.
- E. Modeling in networks in spatial databases
- F. Inserting, updating, and deleting table data

III. Data Management

- A. Coordinate transformations
- B. Creating, editing, and deleting GIS data
- C. Advanced editing tools
- D. Topology
- E. Introduction to automation tools

IV. Data Quality and Standards

- A. Metadata
- B. Data needs analysis
- C. GIS data standards
- D. Data backup procedures

V. Spatial Analysis Introduction

- A. Geographic inquiry process
- B. Geoprocessing tools review
- C. Network analysis fundamentals

METHODS OF PRESENTATION

1. Lecture
2. Cooperative learning

3. Discussion
4. Hands-on lab exercises

STUDENT OUTCOMES: (*The student should...*)

1. source and use vector and raster GIS data in a variety of digital formats.
2. understand fundamental spatial database concepts, such as data structures, schema design, and implementation
3. apply SQL queries for the selection of datasets within a GIS system.
4. demonstrate the ability to use editing tools to create, validate and modify geometry.
5. understand data quality concepts, issues, and workflows.
6. apply topology rule to preserve desired spatial relationships within data sets.
7. understand how to automate common tasks with GIS software tools, such as batch processing, and ArcGIS's ModelBuilder.
8. understand the geographic inquiry process as a problem solving methodology for spatial analysis.

METHODS OF EVALUATION

Grades are based on demonstrated proficiency in subject matter. Proficiency is determined from:

1. Completion of laboratory exercises
2. Passing exams
3. Completion of various homework assignments

TEXTBOOK & INSTRUCTIONAL MATERIALS

Longley et al., Geographic Information Systems and Science, 4th ed., Wiley, 2016

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