



GEOGRAPHIC INFORMATION SYSTEM APPLICATIONS IN PUBLIC HEALTH HPA 564

Course Description: This online course examines Geographic Information System (GIS) applications in Public Health and the process of designing a GIS-based public health investigation.

Course Overview: Most of the information that is available nowadays contains a location reference which places it at some point in space (e.g., longitude and latitude of households). Space is a very significant dimension which has to be accounted for when dealing with environmental and public health problems. For example, by comparing the locations of households with other geographically referenced information, such as the location of nearby industrial sites emitting pollutants and the number of rare cancers, a researcher may reveal that in the proximity of the industrial site the number of rare cancers is, relatively, high. This finding and the geographic distribution of the “problem” will assist public health officials and regulators to perform their duties more effectively (e.g., emergency measures to protect public, cleanup operations, etc.). Thus, a Geographic Information System (GIS) has the potential to reveal important new information that can lead to more effective risk management and decision making strategies.

What is a GIS? In general, one definition is that a Geographic Information System (GIS) is a configuration of hardware and software that captures, stores, analyzes and displays information on a spatial scale. *“GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies.”* (ESRI, 2004). The rapid growth of GIS applications in environmental and public health has made the capacity to understand the opportunities and limitations associated with GIS techniques an essential part of public health education.

For this course assignments and case studies will be used to develop skills, to illustrate problems and solutions, to stimulate discussion, and to integrate geographic information system design principles into the many applications areas found in public health.

The main objectives of this course are to:

- Promote a critical understanding of the major practices and techniques associated with GIS in the many applications areas found in public health.
- Foster an operational understanding of the functions used to store, analyze and display information on a spatial scale.
- Provide the in-depth coverage of the basic GIS-related sources and data base structures.
- Develop awareness for the advantages and limitations related to the use of GIS.

Prerequisites: BSTT400 and HPA 465 and consent of the instructor.

Learning Objectives: This course relies on the ArcGIS 9.1 software which is one of the widely used GIS software packages. Students are not expected to become GIS programmers; however, by successfully finishing this course students are expected to:

- Understand the various components of a GIS, their potentials, and limitations
- Formulate a GIS project design specification
- Understand the GIS functions for storing, analyzing, and displaying information on a spatial scale
- Competently communicate with GIS specialists and user teams

Course Management System: The course content will be delivered via UIC's Blackboard Learning System. Students will be enrolled into the Blackboard course site each semester after registering. The Blackboard course site is the primary content area for instructors to post lecture notes and articles, post and update grades, and make announcements. Students are expected to log into their course site regularly to learn about any developments related to the course. Learn more about Blackboard at <http://blackboard.uic.edu>.

Textbook/Required Readings:

Introduction to Geographic Information Systems in Public Health by A. Melnick. Aspen Publishers, Inc., 2002. (ISBN: 083421878X) NOTE: This book is out of print. Chapters will be posted to the course site.

Getting to Know ArcGIS Desktop, Second Edition, by T. Ormsby, E. Napoleon, R. Burke, L. Feaster, and C. Groessl. ESRI Press, 2nd Ed., 2004. (ISBN: 1-58948-083-X)

NOTE: Must have CD with trial version of ArcGIS 9.2 included

Download the "Errata for ArcGIS Desktop 9.2" PDF from the below website. This PDF includes changes to the **Getting to Know ArcGIS Desktop** since it was last published.

Grading:

Assignments	20%
Final Exam	50%
Case Study 3	30%

Participation: Distance learning offers many advantages to professionals wishing to enhance their education in the environmental health sciences disciplines. A paramount component of the didactic process is active and critical participation. We strongly encourage you to participate by posting questions, comments, thoughts, etc.

Assignments: There are **two (2) Assignments** (20% total). The assignments cover specific aspects of GIS techniques and you will be required to use the ArcGIS 9.1 software. The assignments are really screenshot outputs of a few of the exercises from the ArcGIS book.

Case Studies: There are **three (3) Case Studies**. The case studies cover a range of GIS techniques applied to public health data. The first two case studies require the use of ArcGIS and are **individual efforts**. For each case study, you are required to generate a final report or output to be turned in with your final. The third case study does not require the use of ArcGIS and is a **group project**.

Final Exam: A final exam will be given. The exam will take two hours and consist of 8 short essay questions only relating to the material in Melnick.